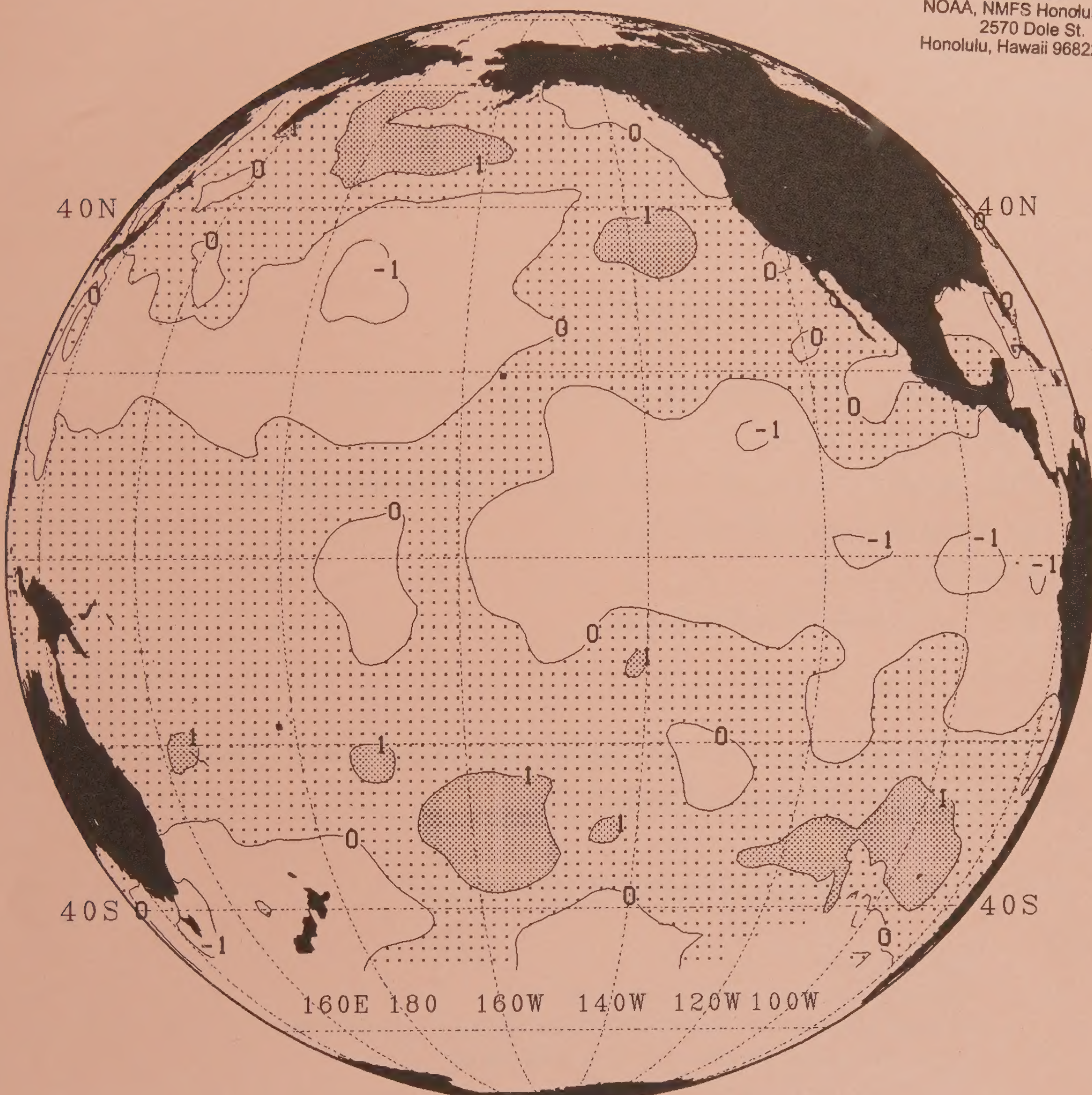
気象庁海洋月報

Monthly Ocean Report

December 1996 (No. 48)



Climate and Marine Department
Japan Meteorological Agency

気象庁 気候・海洋気象部

平成8年12月

気象庁海洋月報は、気象庁 気候·海洋気象部 海洋課で作成されています。

本月報に関する問い合わせは、

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表紙は、1996年12月の太平洋の月平均海面水温偏差図です。
陰影部は、平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for December 1996 in the Pacific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（１９９６年１２月）

太平洋の海況

太平洋赤道域の155゜W以東では－0.5℃以下の負偏差域が大きく広がり、特に、120゜W以東では－1℃以下の負偏差域も見られた。エルニーニョ監視海域（4゜S～4゜N、150゜W～90゜W）の海面水温偏差は、-0.8℃だった。一方、170゜E以西では平年より0.5℃以上高い海域が見られ、その範囲は前月より広くなった（第１表、第１図、第６図）。

太平洋の赤道に沿った表層水温断面図によれば、水温躍層付近で西部では正偏差、東部では負偏差という分布に変化がないが、西部の正偏差の大きさは11月より大きくなった（第９図）。

20～40゜Nの－0.5℃以下の負偏差域は11月よりも小さくなり、170゜Eから160゜Wに限られた。一方、カムチャツカ半島から160゜Wにかけての50゜N以北、及び35゜N,135゜W付近では、＋1℃以上の正偏差域が見られた（第６図）。

日本近海の海況

常磐沖から北海道南方にかけて平年より１℃以上高かった。東シナ海では、＋0.5℃以上の正偏差が広がっていた（第24図）。

黒潮は、九州から紀伊半島にかけて接岸して流れた後、東に流れ、八丈島付近を経て、上・中旬は142゜E付近を、下旬には145゜E付近を北上し、35゜N付近を東に流れていた（第27図）。

本州東方の親潮系の冷水は、41.4゜N,144.7゜Eまで達していた。また、本州東方では、常磐沖と青森県沖に暖水塊が見られた（第26～27図）。

熱帯の気象

対流活動はインド洋東部から海洋大陸にかけてと日付変更線より東のITCZ、SPCZで平年より活発である一方、160゜E～160゜Wの赤道太平洋では不活発だった。200hPaでの大規模な発散中心はニューギニア島の西に存在し、平年よりも約30度西に偏っていた。850hPaでの赤道上空の風は、先月から太平洋全域で東風偏差、インド洋から海洋大陸付近で西風偏差という状態が継続していて、特に太平洋東部の東風偏差の指数は1978年12月以来で最大となった。海面気圧は熱帯太平洋の大部分で負偏差となったものの、南方振動指数（SOI）は再び正の値(+0.8)に戻った（第１表、第3～5図、第12図）。

HIGHLIGHTS December 1996

Pacific

Negative sea surface temperature (SST) anomalies lower than -0.5°C spread east of 155°W in the equatorial Pacific, especially east of 120°W where anomalies were lower than -1°C. The SST index for region B (Fig. 1) was -0.8°C. On the other hand, the areal extent of more than 0.5°C above-normal SSTs west of 170°E increased compared to that observed in November (Table 1, Figs. 1 and 6).

In the equatorial Pacific, subsurface temperatures were above normal in the west, and below normal in the east. This anomaly pattern in the subsurface layers remained similar to that seen in November, although the positive anomalies in the west increased during December (Fig. 9).

Between 20°N and 40°N, the region of negative SST anomalies lower than -0.5°C has become limited to the area from 170°E to 160°W in comparison with November. Meanwhile, positive SST anomalies more than 1°C were found north of 50°N from the Kamchatka Peninsula to 160°W and around 35°N, 135°W (Fig. 6).

Seas adjacent to Japan

SSTs were more than 1°C above normal off Joban and south of Hokkaido and more than 0.5°C above normal in the East China Sea (Fig. 24).

The Kuroshio flowed along the coast of Kyushu and Shikoku, then turned eastward off the Kii Peninsula. After passing near Hachijo Island, it flowed northward along 142°E in the first and second 10 days of the month and along 145°E in the third 10 days of the month. It then flowed eastward along 35°N (Fig. 27).

The Oyashio cold water extended southward to 41.4°N, 144.7°E. Two warm core eddies were observed off Joban and off Aomori (Figs. 26 and 27).

Atmospheric conditions in the tropics

Convective activities were above normal from the eastern Indian Ocean to the Maritime Continent and over ITCZ and SPCZ east of the date line, while they were below normal over the equatorial Pacific from 160°E to 160°W. The center of the large-scale divergence field at 200hPa was situated to the west of New Guinea, about 30 degrees west of its normal position. At 850hPa along the equator, the wind anomaly pattern consisted of easterly anomalies all over the Pacific and westerly ones from the Indian Ocean to the Maritime Continent has lasted since November. Especially, the easterly anomalies over the eastern equatorial Pacific was the maximum since December of 1978. The SOI returned to a positive value (+0.8) in spite of negative sea level pressure anomalies over the tropical Pacific (Table 1, Figs. 3-5 and 12).

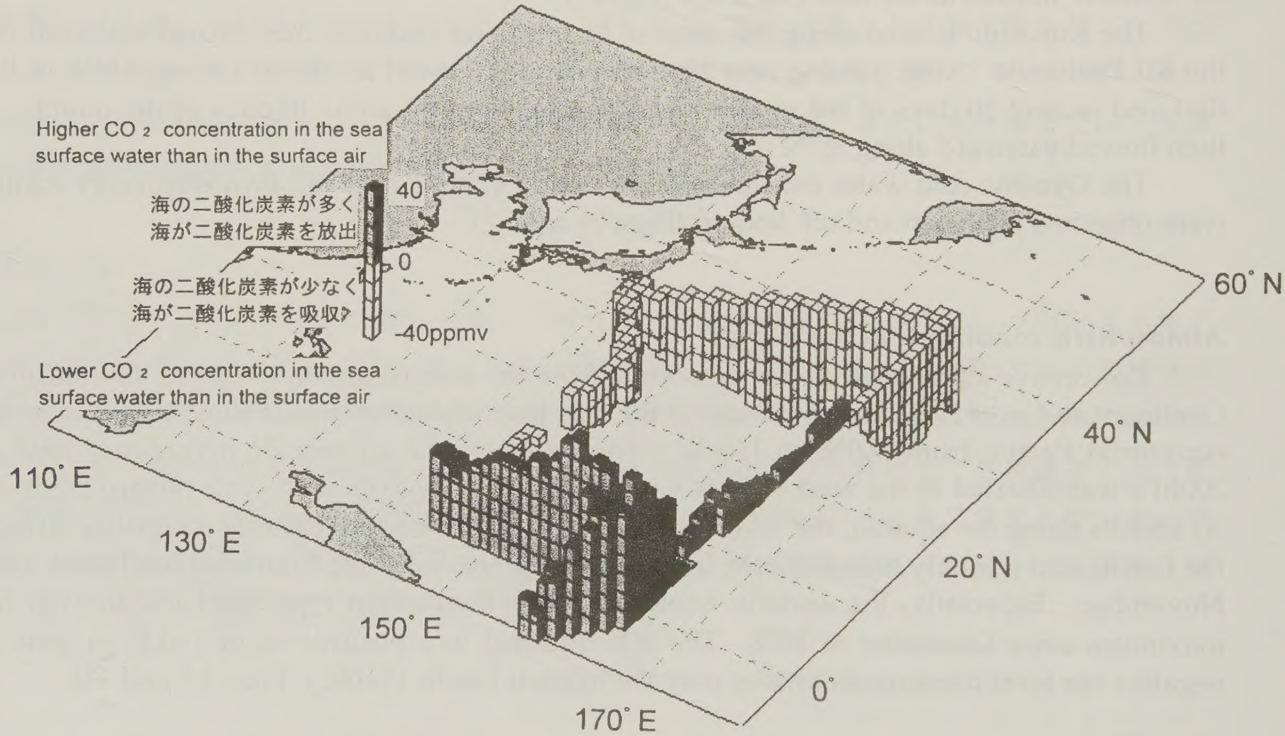
西太平洋における二酸化炭素の観測

Observation of carbon dioxide in the western Pacific

気象庁の海洋気象観測船「凌風丸」は、1996年10月９日から12月６日にかけて、太平洋で二酸化炭素の観測を実施した。この観測の結果、赤道付近では、表面海水中の二酸化炭素濃度が大気に比べ80ppmv高く、海から大気に二酸化炭素が放出されていることがわかった。この海域で、このような高い二酸化炭素濃度が観測されたことは、1989年以来のことである。最近の研究 (Inoue et al. 1996)によれば、赤道域の海水中の二酸化炭素濃度は、海況変動と密接に関わっており、中部太平洋の赤道域は、ラニーニャ現象発生時には二酸化炭素の強い放出域となり、エルニーニョ現象の時には、弱い放出域となる。

The Japan Meteorological Agency made observation of carbon dioxide (CO_2) in the western Pacific on board the R/V Ryofu Maru from October 9 to December 6, 1996. According to these observations, the concentration of CO_2 in the surface water in the western equatorial Pacific was about 80ppmv higher than that in the surface air, showing that CO_2 was being released to the atmosphere from the ocean. The value of the concentration of dissolved CO_2 was the highest in this region since 1989. According to a recent study (Inoue et al. 1996), the dissolved CO_2 concentration near the equator is closely related to ocean variations: the central Pacific along the equator acts as a strong source of CO_2 during La N iña, while it acts as a weak source during El N iño.

Reference
Inoue, H., M. Ishii, H. Matsueda, M. Ahoyama and I. Asanuma, 1996: Changes in Longitudinal Distribution of the Partial Pressure of CO_2 (pCO_2) in the Central and Western Equatorial Pacific, West of 160°W, *Geophys. Res. Letters*, **23**, 14, 1781-1784.



図A　1996年10～12月に太平洋で海洋気象観測船「凌風丸」が観測した洋上大気中と表面海水中の二酸化炭素の濃度差。棒グラフは、海水中の濃度が高い場合、海洋から大気へ二酸化炭素を放出するので上向き（陰影あり）に、逆の場合、海洋が大気の二酸化炭素を吸収するので下向き（陰影なし）に示してある。

Fig. A　Differences between CO_2 concentrations in the sea surface water and in the surface air in the Pacific observed by the R/V Ryofu Maru from October to December 1996. Shaded upward pillars indicate that the ocean was emitting CO_2 to the surface air due to a higher CO_2 concentration in the surface water. Downward pillars indicate absorption of atmospheric CO_2 by the ocean.

El Niño monitoring indices

DATE	SEA SURFACE TEMPERATURE AND ANOMALY (°C)								SEA LEVEL ANOMALY (cm)					
	Region D 14N-Eq. 130E-150E		Region A 4N-4S 160E-150W		Region B 4N-4S 150W-90W		Region C Eq.-10S 90W-80W		Yap 10N,138E	Rabaul 4S,152E	Majuro 7N,171E	Tarawa 1N,173E	Christ-mas 2N,157W	Santa Cruz 1S, 90W
JAN 96	29.0	+0.5	27.9	-0.1	25.0	-0.4	24.1	-0.2	9.2	13.7	7.9	5.5	-2.7	-3.0
FEB 96	28.6	+0.3	27.6	-0.4	25.7	-0.5	26.0	+0.3	9.7	14.0	5.9	4.2	-3.1	6.1
MAR 96	28.8	+0.4	27.8	-0.3	26.7	-0.2	25.9	0.0	8.2	11.8	-3.7	6.1	0.3	1.0
APR 96	29.3	+0.5	28.1	-0.1	26.7	-0.4	24.1	-1.0	-4.4	12.9	5.0	2.6	-2.8	-4.4
MAY 96	29.6	+0.5	28.5	0.0	26.2	-0.4	22.9	-1.0	-8.8	14.2	7.8	7.9	-0.7	-3.7
JUN 96	29.7	+0.4	28.6	0.1	25.7	-0.4	21.5	-1.2	2.5	10.1	4.4	5.1	-0.6	-5.1
JUL 96	29.8	+0.6	28.4	-0.1	25.1	-0.1	20.4	-1.2	12.3	12.9	3.8	1.2	-3.7	-0.2
AUG 96	29.6	+0.5	28.4	0.0	24.3	-0.3	20.5	-0.1	10.5	16.0	8.4	1.5	-1.4	-2.1
SEP 96	29.8	+0.6	28.4	+0.1	24.3	-0.3	19.8	-0.5	13.3	-	14.5	2.4	-7.9	-2.9
OCT 96	29.9	+0.6	28.5	+0.1	24.3	-0.3	20.4	-0.3	14.9	15.9	12.2	0.9	-3.2	-4.3
NOV 96	29.5	+0.3	28.2	-0.2	24.3	-0.3	20.5	-1.0	11.1	-	13.0	2.5	-5.1	-4.8
DEC 96	29.2	+0.3	28.3	+0.1	24.1	-0.8	21.8	-0.8						

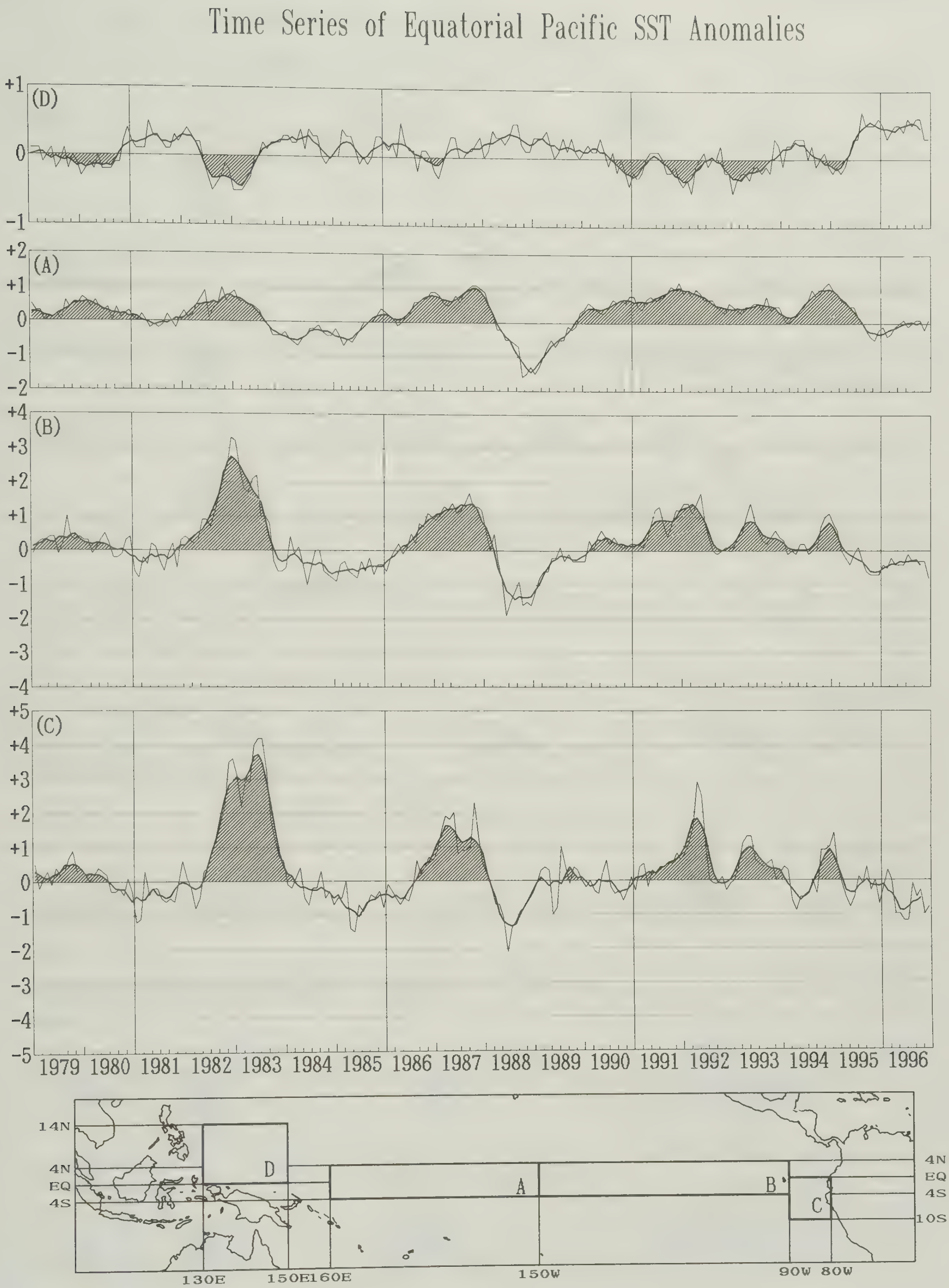
第1表（a）　エルニーニョ監視指数

Table 1 (a)　El Niño monitoring indices. Data sources are the SOC for ISLP-Pac, Department of Oceanography, University of Hawaii for the sea level anomaly. All the data of sea level anomaly has been revised.

DATE	SOI	SEA LEVEL PRESSURE ANOMALIES		HIGH CLOUD AMOUNT INDEX			EQUATORIAL ZONAL WIND INDEX				
		TAHITI 17°33'S, 149°37'W	DARWIN 12°24'S, 130°52'E	HCLD-PH 20N-10N 110E-140E	HCLD-MC 5N-5S 110E-135E	HCLD-DL 5N-5S 170E-170W	U200-IN 5N-5S 80E-100E	U200-CP 5N-5S 180 -125W	U850-WP 5N-5S 160E-175W	U850-CP 5N-5S 170W-135W	U850-EP 5N-5S 130W-100W
JAN 96	0.8	1.0	-0.7	1.6	1.5	-1.3	-1.0	0.8	-1.2	-1.2	0.0
FEB 96	0.1	-0.3	-0.5	1.7	1.4	-1.1	-0.7	0.4	-1.1	-1.4	-0.6
MAR 96	0.7	1.0	-0.3	0.3	-0.4	-1.2	-0.2	0.0	-1.1	-1.5	-0.3
APR 96	0.8	0.5	-0.5	2.4	0.6	-0.7	-1.3	1.1	-1.6	-1.1	-0.5
MAY 96	0.3	1.2	1.2	0.6	0.0	-0.6	-1.3	0.8	-1.0	-1.3	0.3
JUN 96	1.4	1.6	-0.2	-1.4	0.4	-0.6	0.8	1.0	-1.4	-2.0	0.5
JUL 96	0.7	0.6	-0.6	0.8	0.1	-0.7	-0.3	1.3	-1.4	-2.1	-0.1
AUG 96	0.4	0.4	-0.3	-1.6	1.0	-0.9	0.9	0.8	-1.3	-1.1	0.3
SEP 96	0.5	-0.7	-1.7	1.7	0.3	-0.9	-2.3	1.2	-1.3	-1.9	0.5
OCT 96	0.4	-0.1	-0.8	-0.3	1.9	-0.8	-2.1	0.9	-1.8	-1.8	0.5
NOV 96	0.0	-0.5	-0.5	2.2	1.0	-0.9	-1.0	0.1	-1.1	-1.4	-0.6
DEC 96	0.8	-0.3	-1.9	0.1	1.1	-1.0	-2.1	1.0	-0.7	-1.6	-2.6

第１表（ｂ）　エルニーニョ監視指数（続き）

Table 1 (b)　El Niño monitoring indices (continued).



第1図　太平洋赤道域の海面水温偏差時系列図

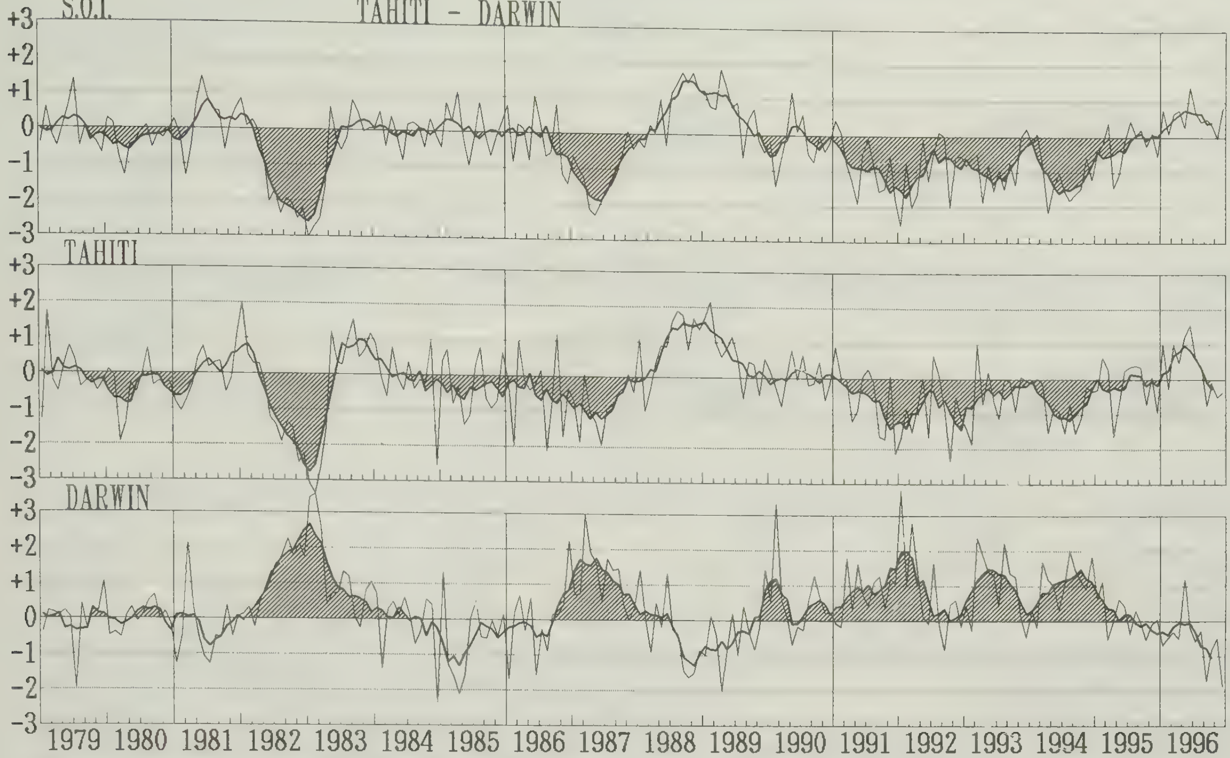
Fig.1 Time series of monthly mean SST anomalies (°C) in the equatorial Pacific Ocean for the areas indicated at the bottom.
Thin lines show the monthly means and thick lines their 5-month running means.　Positive anomalies (A, B, C) and negative anomalies (D) are shaded.　Anomalies are computed from the JMA climatology (1961-1990).



第2図　太平洋月平均海面水位偏差時系列図

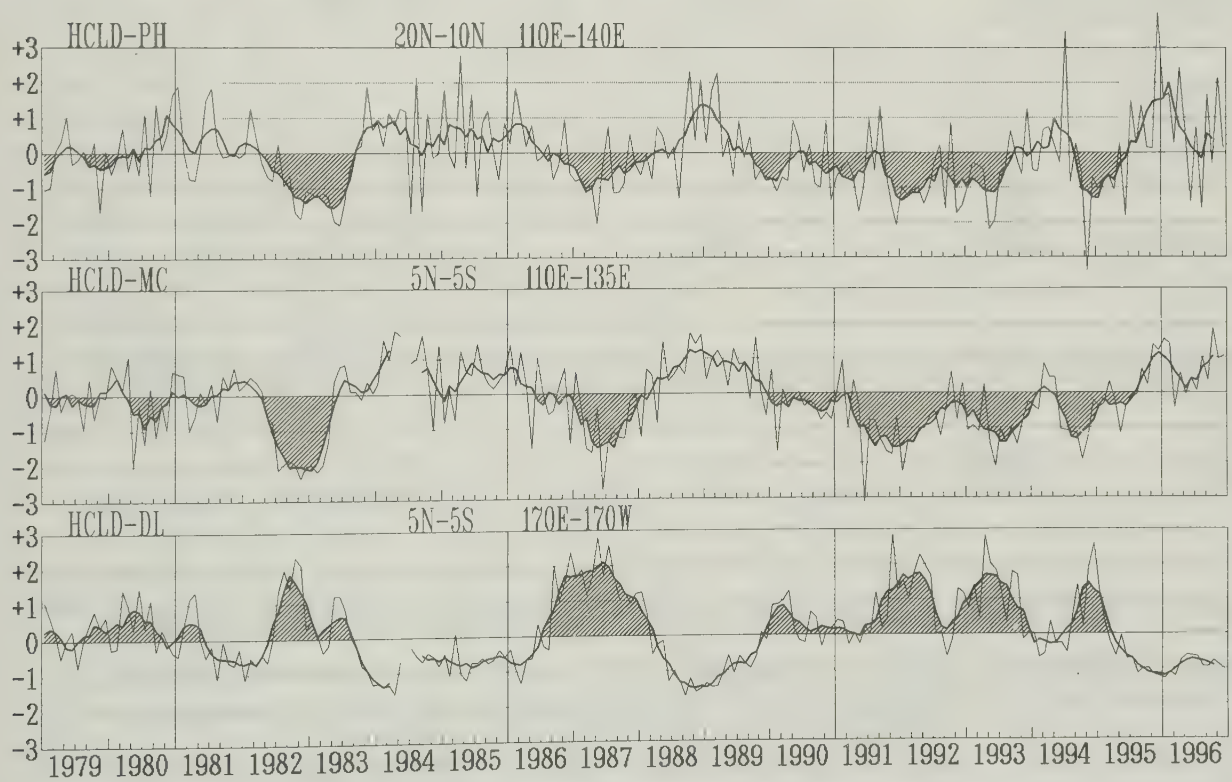
Fig.2 Time series of sea level anomalies computed from 1976-1990 monthly mean values obtained from the stations indicated at the bottom. Thin lines show the monthly mean and thick lines their 5-month running means. Positive anomalies are shaded.

Time Series of SOI and High-Cloud Amount Index



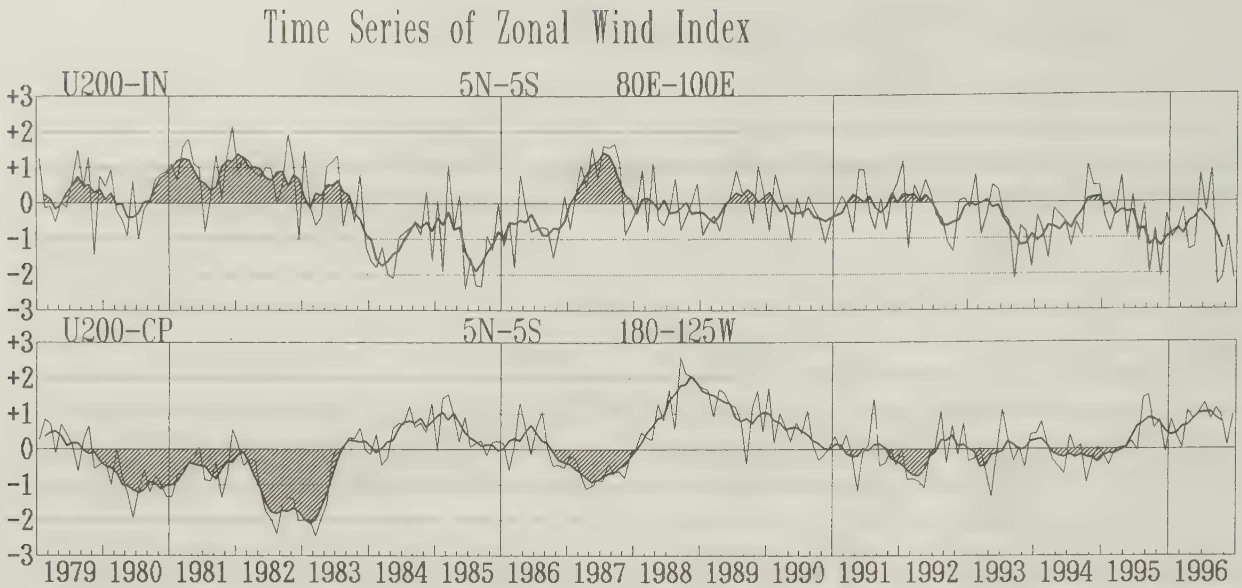
第3図　南方振動指数及び海面気圧偏差時系列図

Fig.3 Time series of the Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5-month running means. Negative anomalies (top, middle) and posotive anomalies (bottom) are shaded. Normals and standard deviations are computed from 1961-1990 base periods.



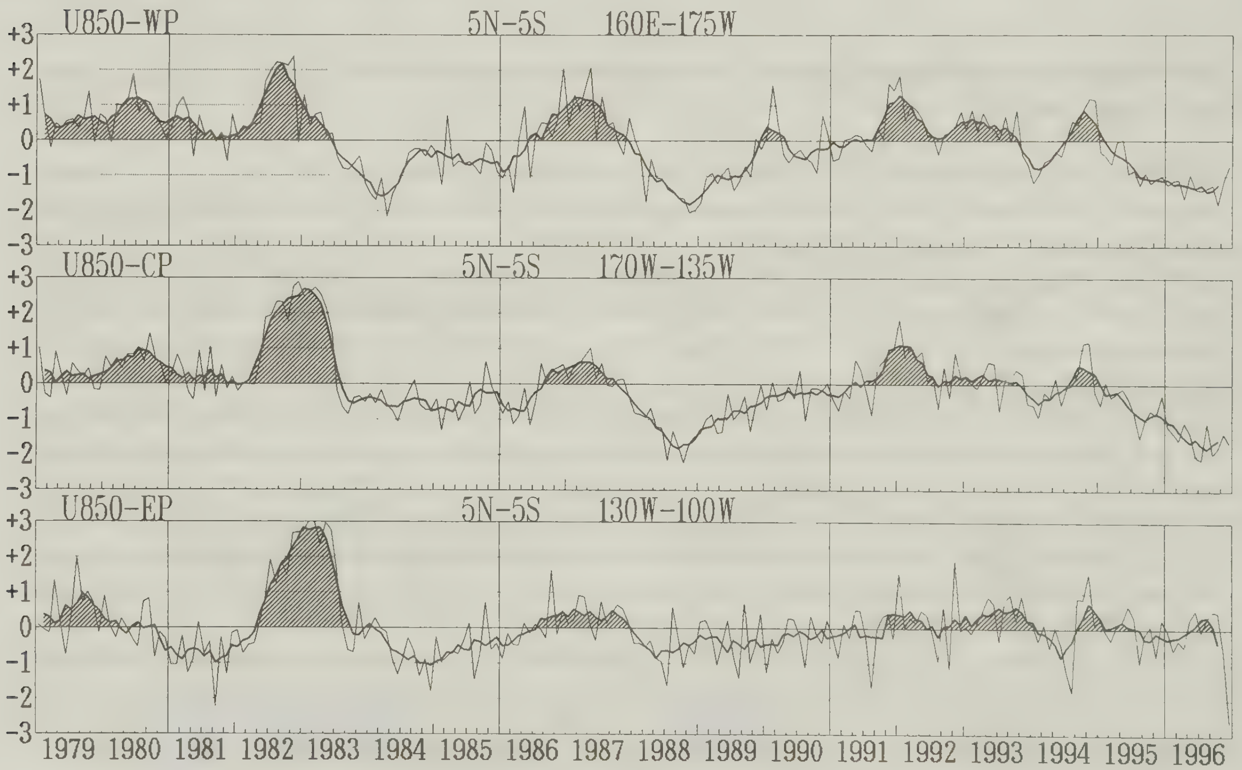
第4図　月平均上層雲量指数時系列図

Fig.4 Time series of high-cloud amount index averaged over the area 20°N-10°N, 110°E-140°E (top), 5°N-5°S, 110°E-135°E (middle), and 5°N-5°S, 170°E-170°W (bottom). Thin lines show the monthly mean and thick lines their 5-month running means. Negative anomalies (top, middle) and positive anomalies (bottom) are shaded. Normals and standard deviations are computed from 1978-1990 base periods.



第5図-1　赤道域東西風指数(200ｈＰａ)時系列図

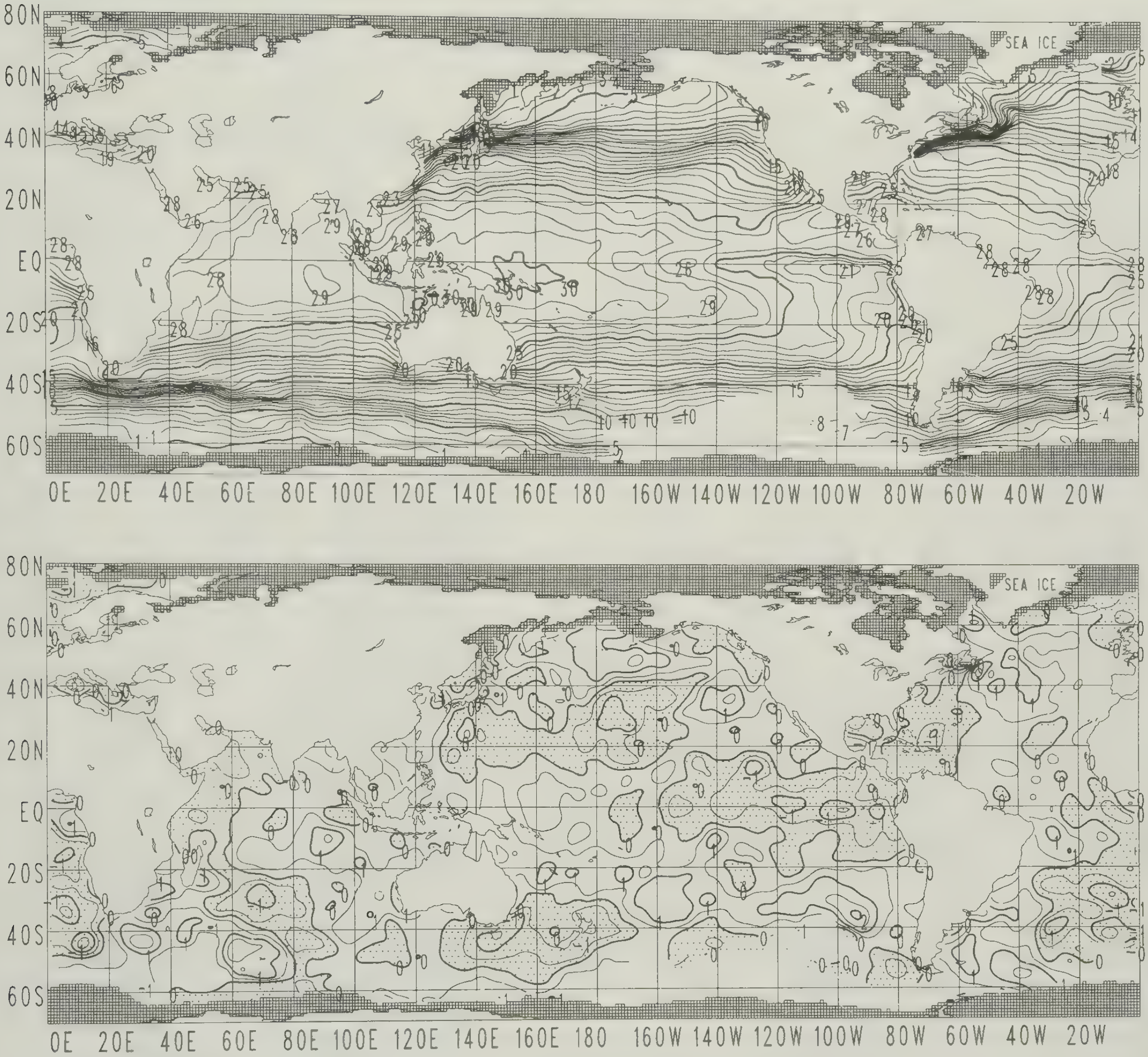
Fig.5-1 Time series of 200hPa zonal wind index averaged over the areas of 5°N-5°S, 80°E-100°E (top), and 5°N-5°S, 180°-125°W (bottom).
Thin lines show the monthly mean and thick lines their 5-month running means.
Positive anomalies (top) and negative anomalies (bottom) are shaded.
Normals and standard deviations are computed from 1979-1990 base periods.



第5図-2　赤道域東西風指数(850ｈＰａ)時系列図

Fig.5-2 Time series of 850hPa zonal wind index averaged over the areas of 5°N-5°S, 160°E-175°W (top), 5°N-5°S, 170°W-135°W (middle), and 5°N-5°S, 130°W-100°W (bottom). Thin lines show the monthly mean and thick lines their 5-month running means. Positive anomalies are shaded.
Normals and standard deviations are computed from 1979-1990 base periods.

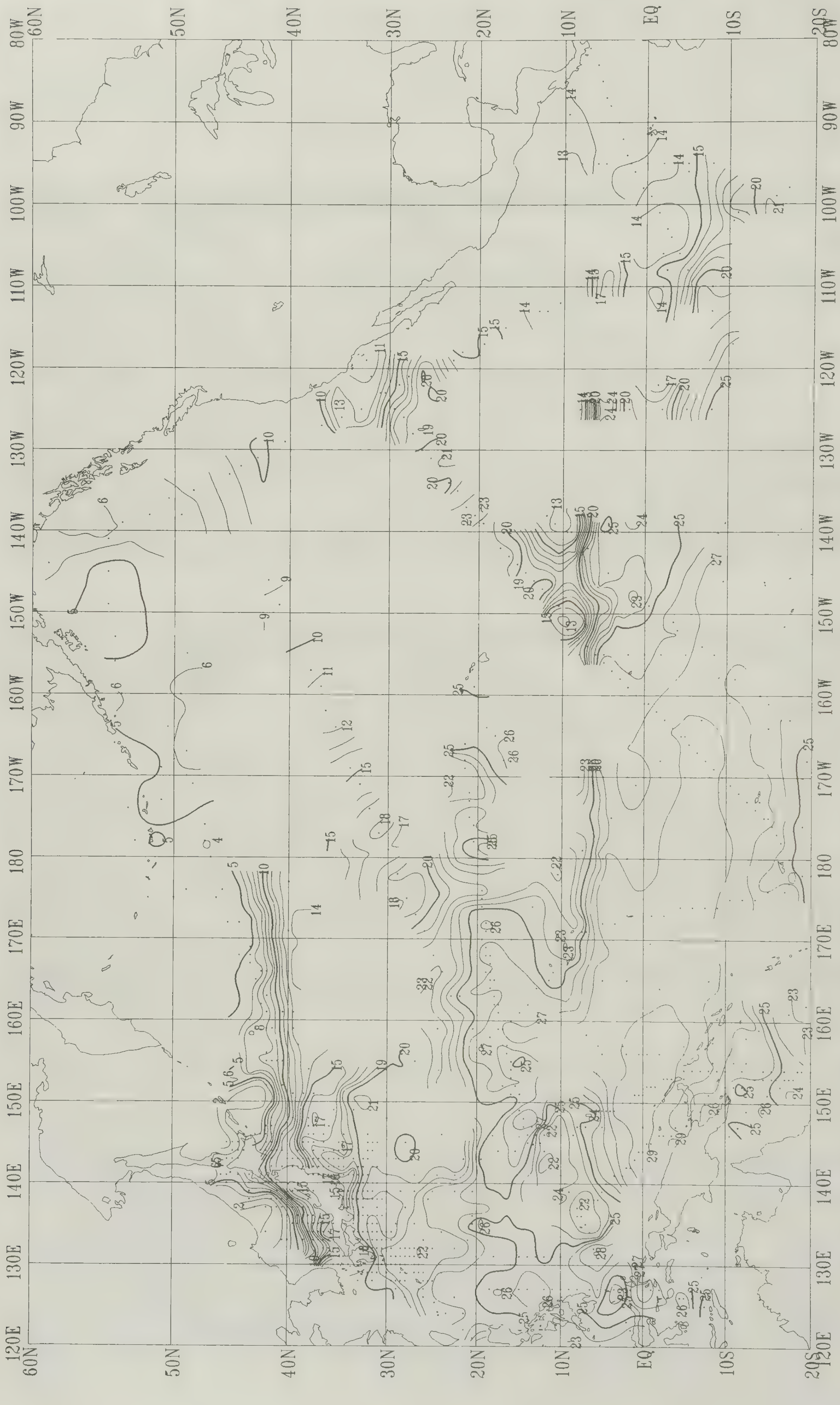
SST & Anomalies in the Global Ocean



第6図　全球月平均海面水温図（上）及び偏差図（下）（1996年12月）

Fig.6 Monthly mean sea surface temperature over the global ocean (top) and anomalies (bottom) for DEC 1996. Anomalies are computed from the JMA climatology (1961-1990) (Marine Department of JMA, 1991, Climatic charts of sea surface temperatures of the western North Pacific and the global ocean). Contour interval is 1°C (top) and additional anomaly contours of ±0.5°C are shown as thin lines. Negative anomalies are spotted. Maximum coverage of sea ice is shaded. Data sources for sea ice are U.S. National Ice Center (polar regions) and JMA (the Sea of Okhotsk).

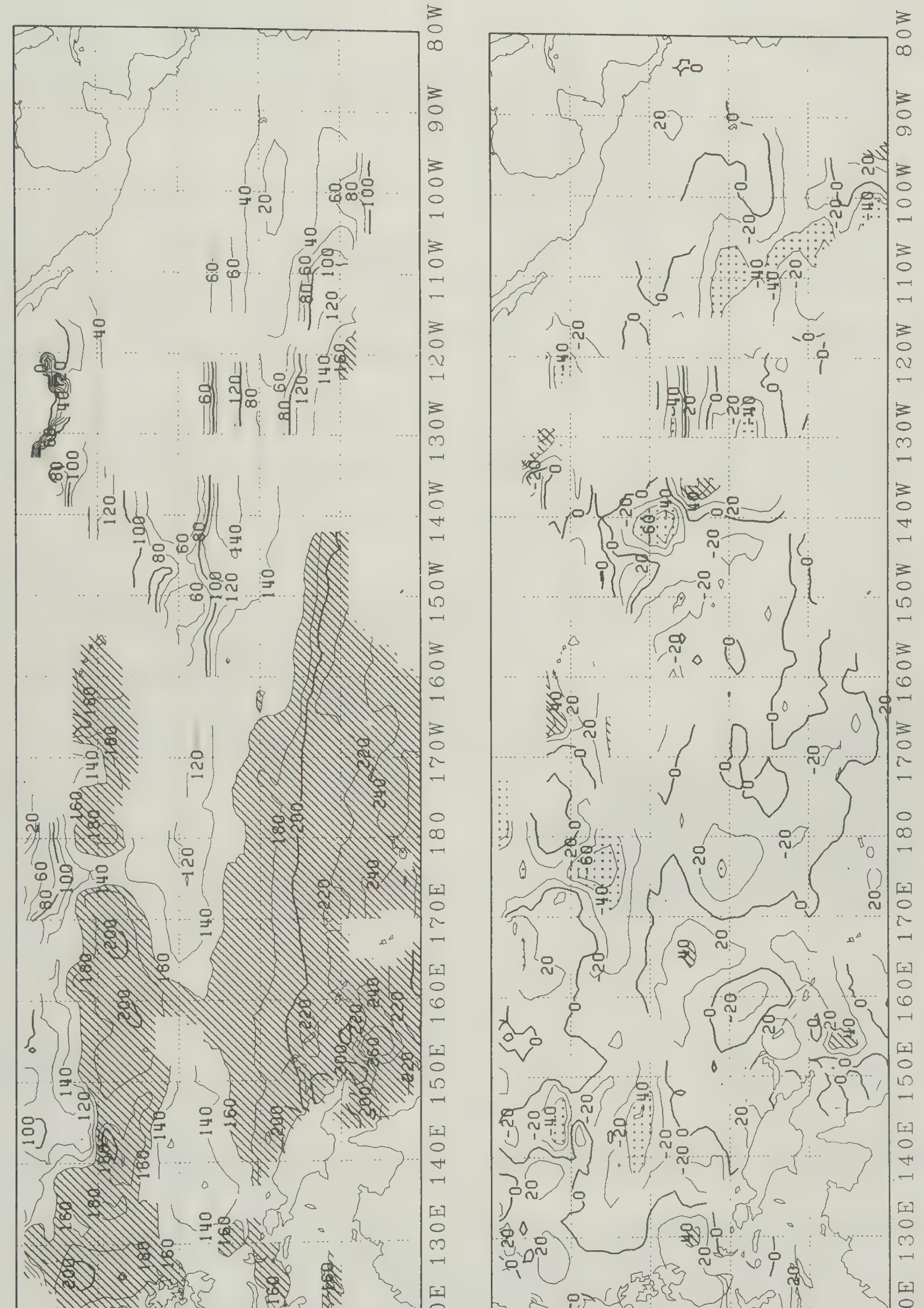
100m Temperature in the Pacific Ocean



第7図　太平洋表層水温(深さ100m)図 (1996年12月)

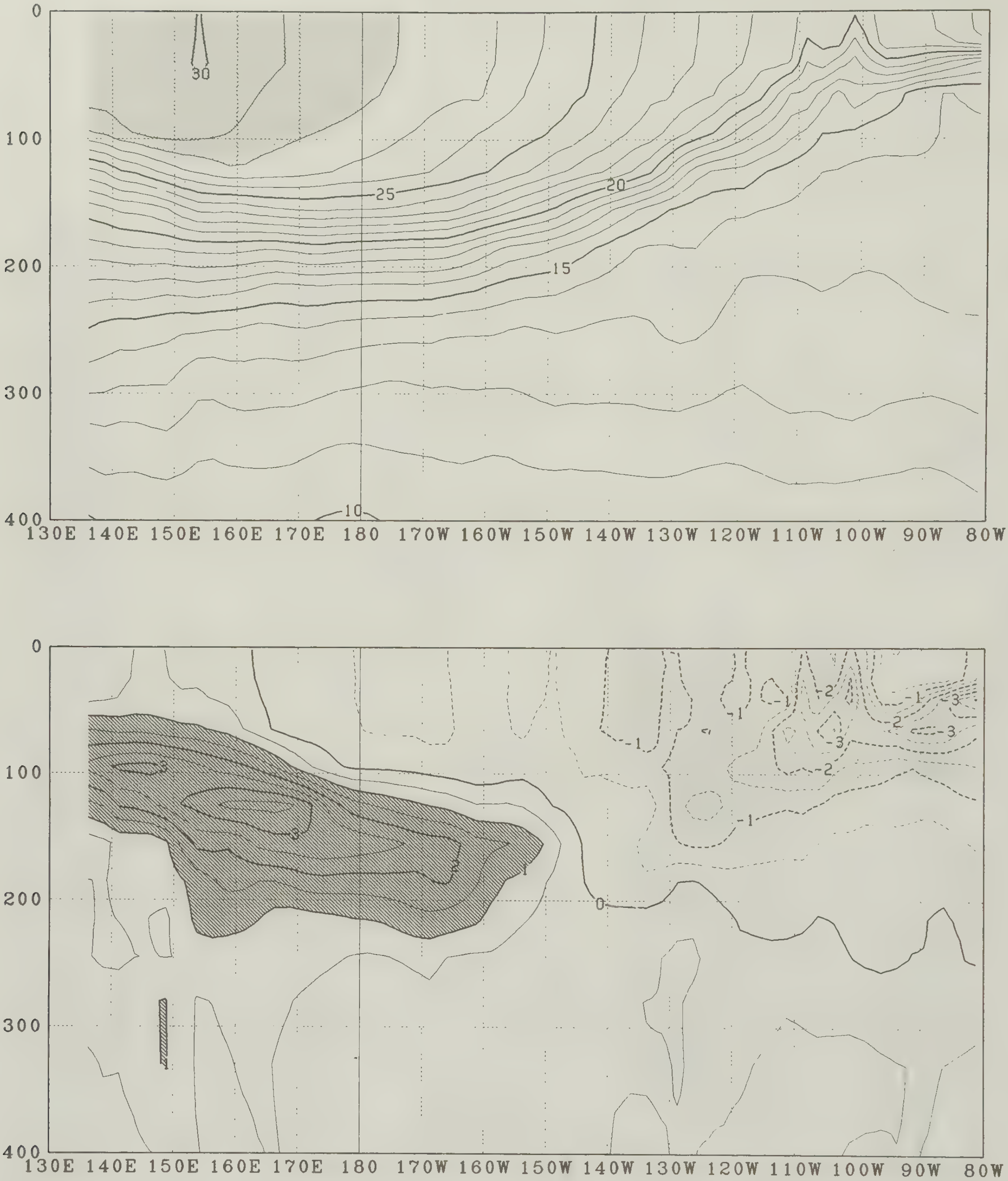
Fig.7 Subsurface (100m) temperatures in the Pacific Ocean for DEC 1996. Contour interval is 1°C. Observation points are denoted by dots.

Depth of 20C & Anomalies in the Pacific Ocean



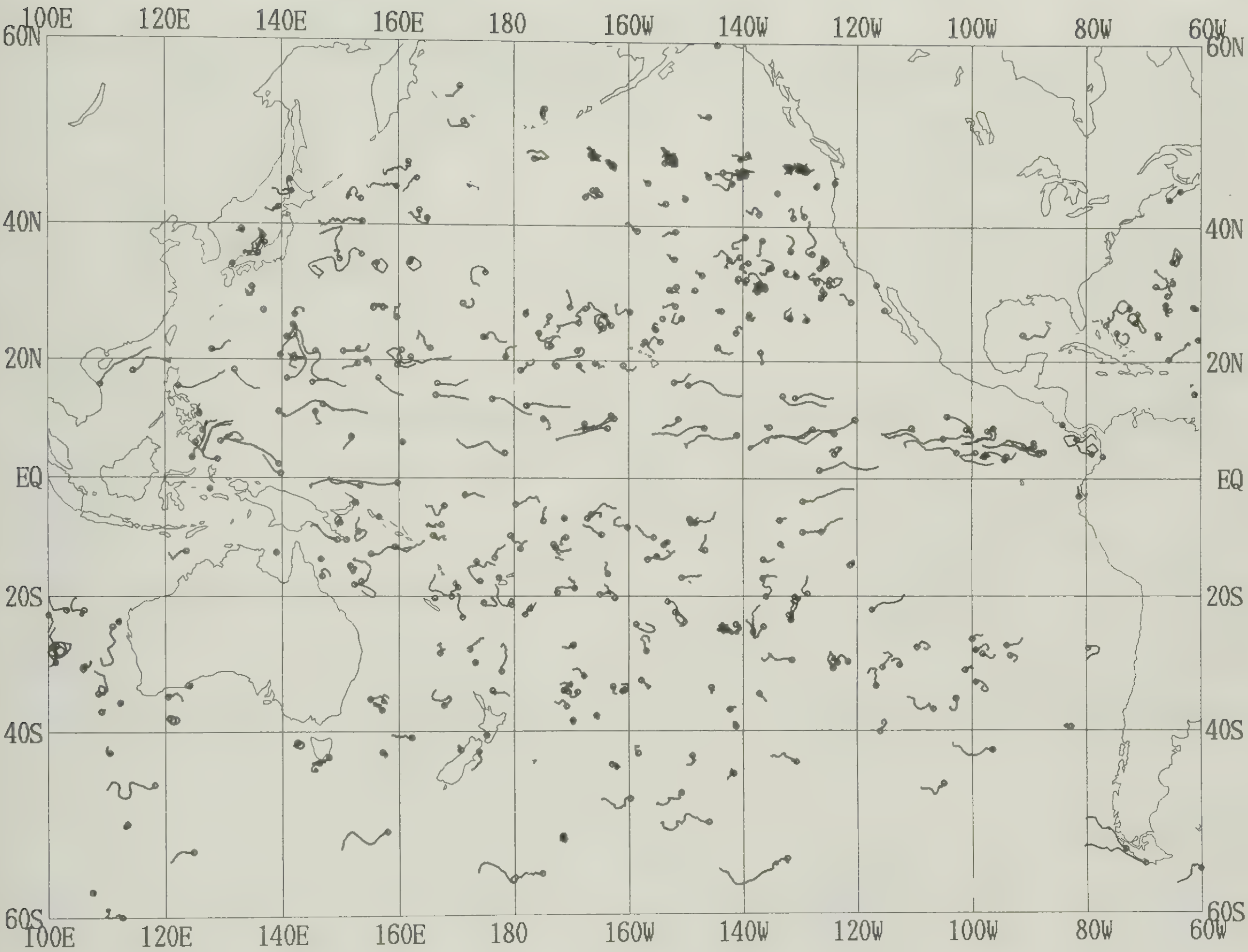
第8図　太平洋20℃深度図（上）及び偏差図（下）（1996年12月）

Fig.8 Depth of the 20°C isotherm in the Pacific Ocean (top) and anomalies (bottom) for DEC 1996. Anomalies are computed from the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA). Contour interval is 20m. Values greater than 160m in top panel are shaded. In bottom panel values greater than +40m are shaded and values less than -40m are spotted.



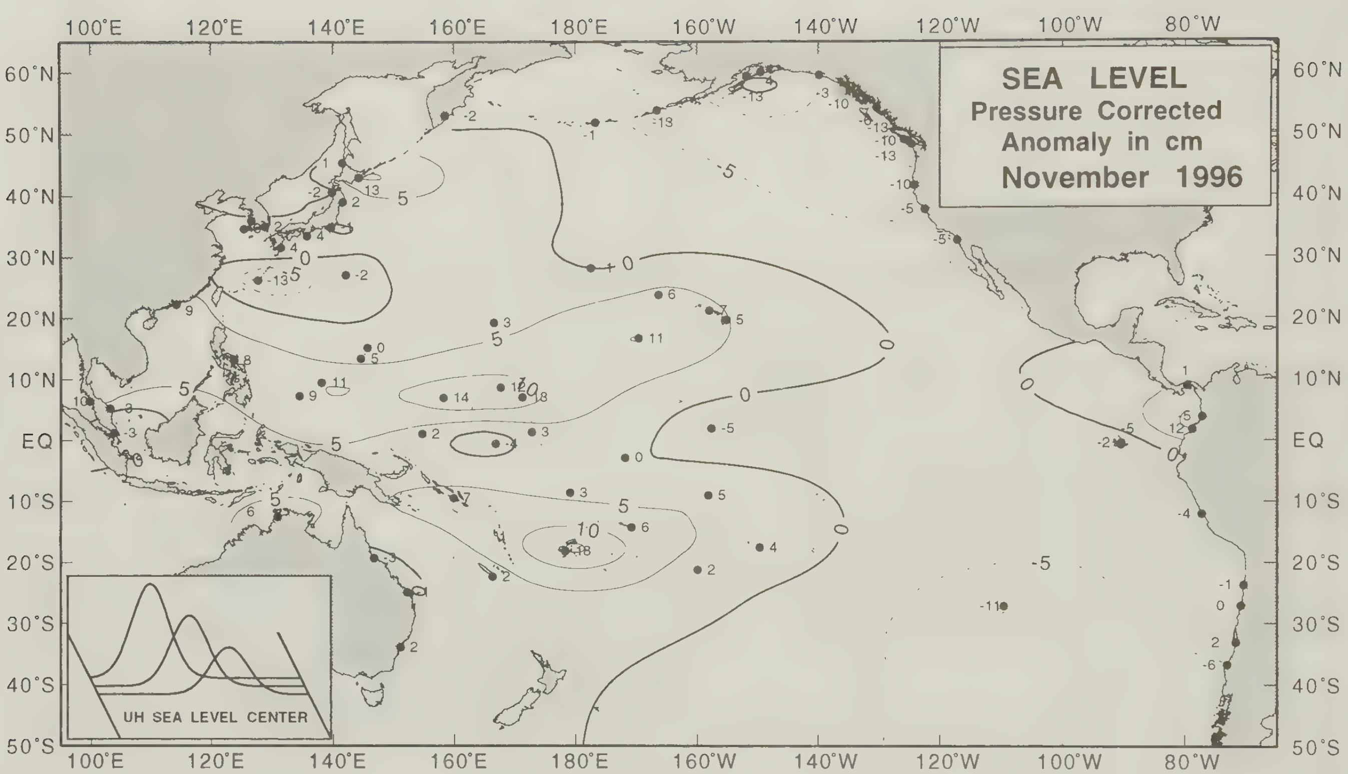
第9図　太平洋赤道に沿う表層水温（上）及び偏差（下）の深度－経度断面図（1996年12月）

Fig.9 Depth-longitude sections of temperature (top) and anomalies (bottom) along the equator in the Pacific Ocean for DEC 1996. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (top) and 0.5°C (bottom). Values greater than 28°C in top panel are shaded. In bottom panel values greater than 1°C are shaded and values less than -1°C are spotted. Anomalies are computed from 1987-1995 base period means.



第10図　太平洋ブイ流跡図(1996年12月)

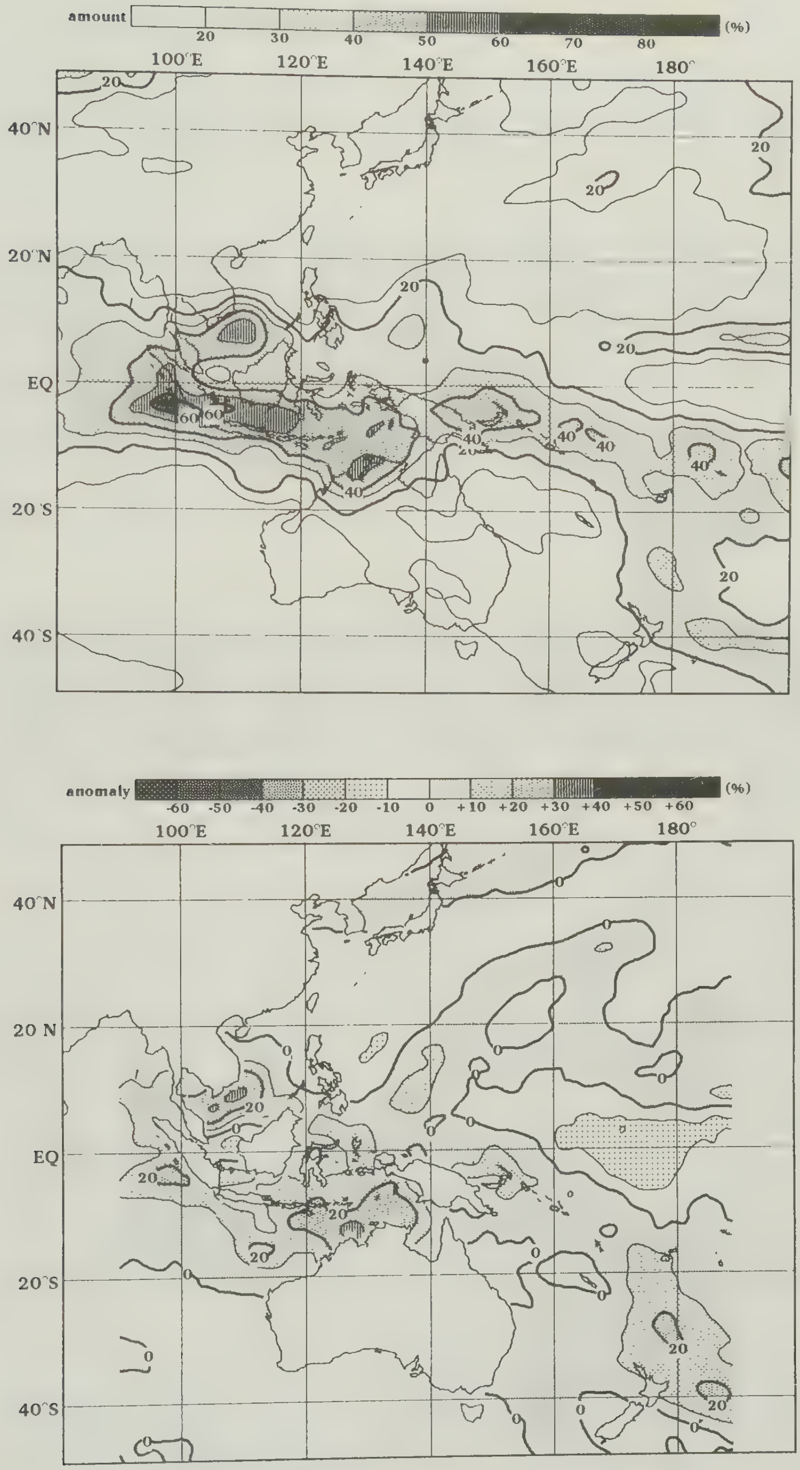
Fig.10　Movements of drifting buoys in the Pacific Ocean during DEC 1996.　Each track is for one buoy. Small circles represent last positions for the month.



第11図　太平洋海面水位偏差図（ 1996年11月 ）

Fig.11 Monthly sea level anomalies for NOV 1996 obtained from mean sea level (1975-1986) adjusted for atmospheric pressure.
This figure is prepared by the SOC of ISLP-PAC, Dept. of Oceanography, Univ. of Hawaii.

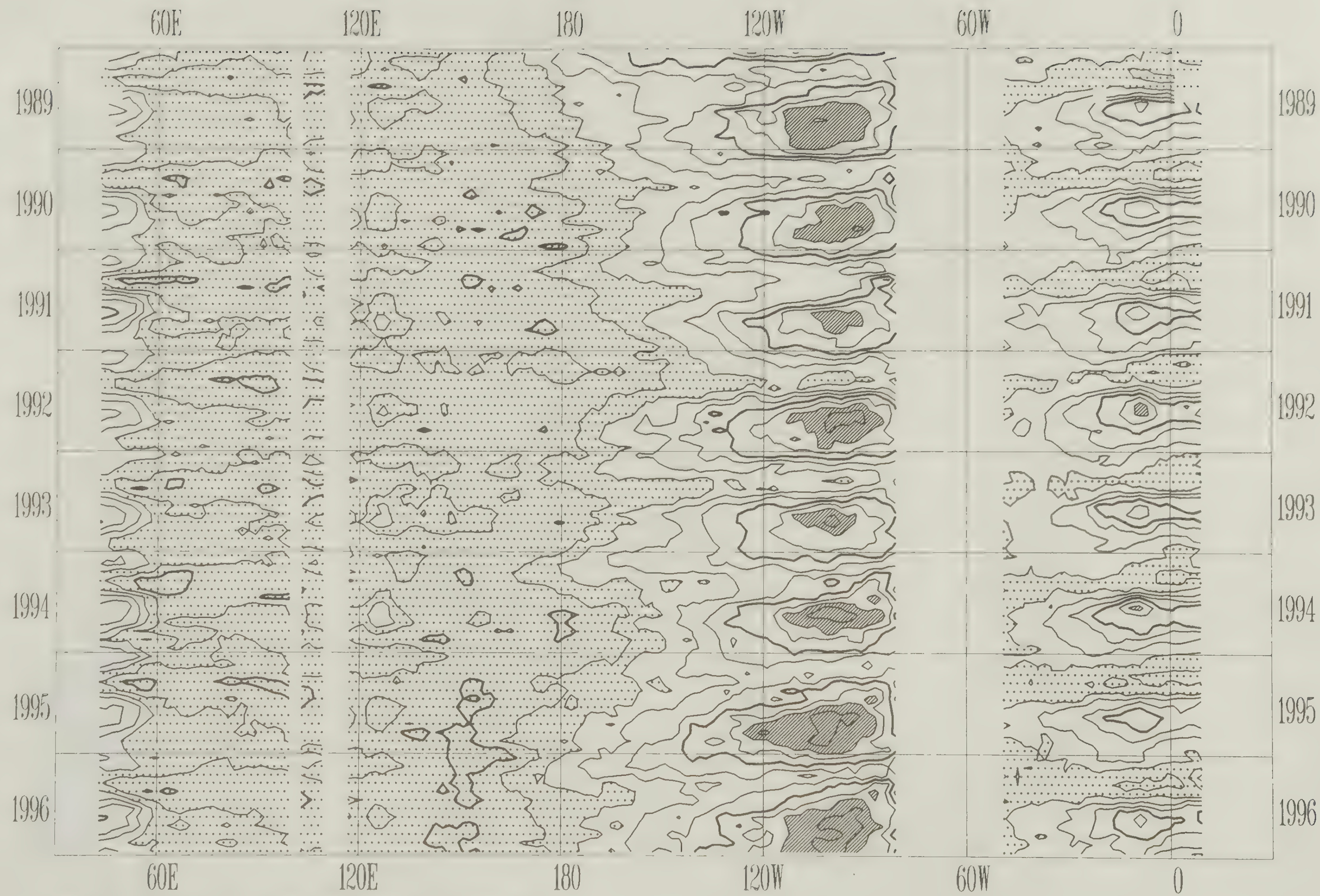
High-Cloud Amount & Anomalies



第12図　西太平洋月平均上層雲量分布図及び偏差図（1996年12月）

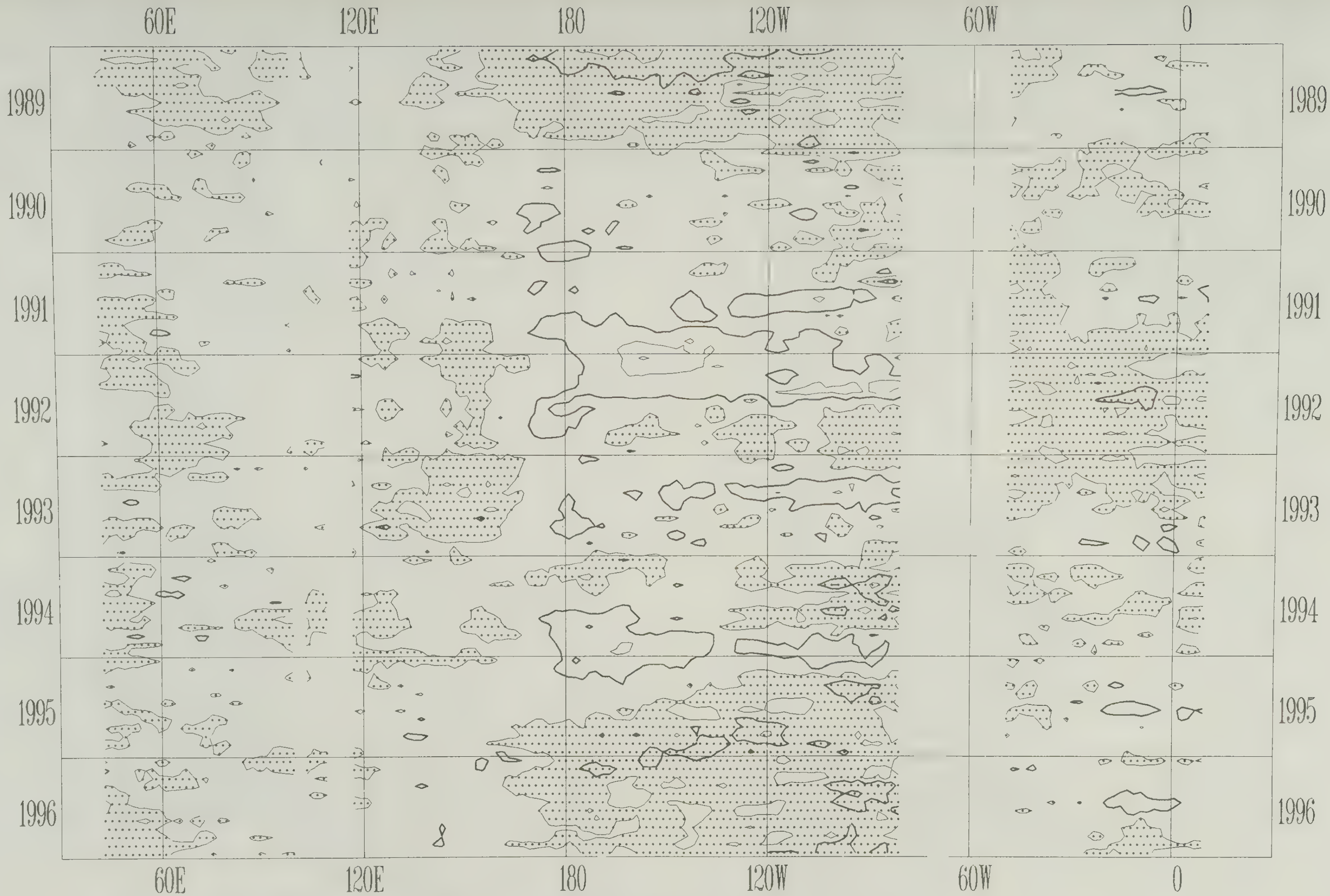
Fig.12 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the western Pacific for DEC 1996. Contour interval is 10%. Anomalies are computed from 1978-1990 base period means.

Time-Longitude Section of SST



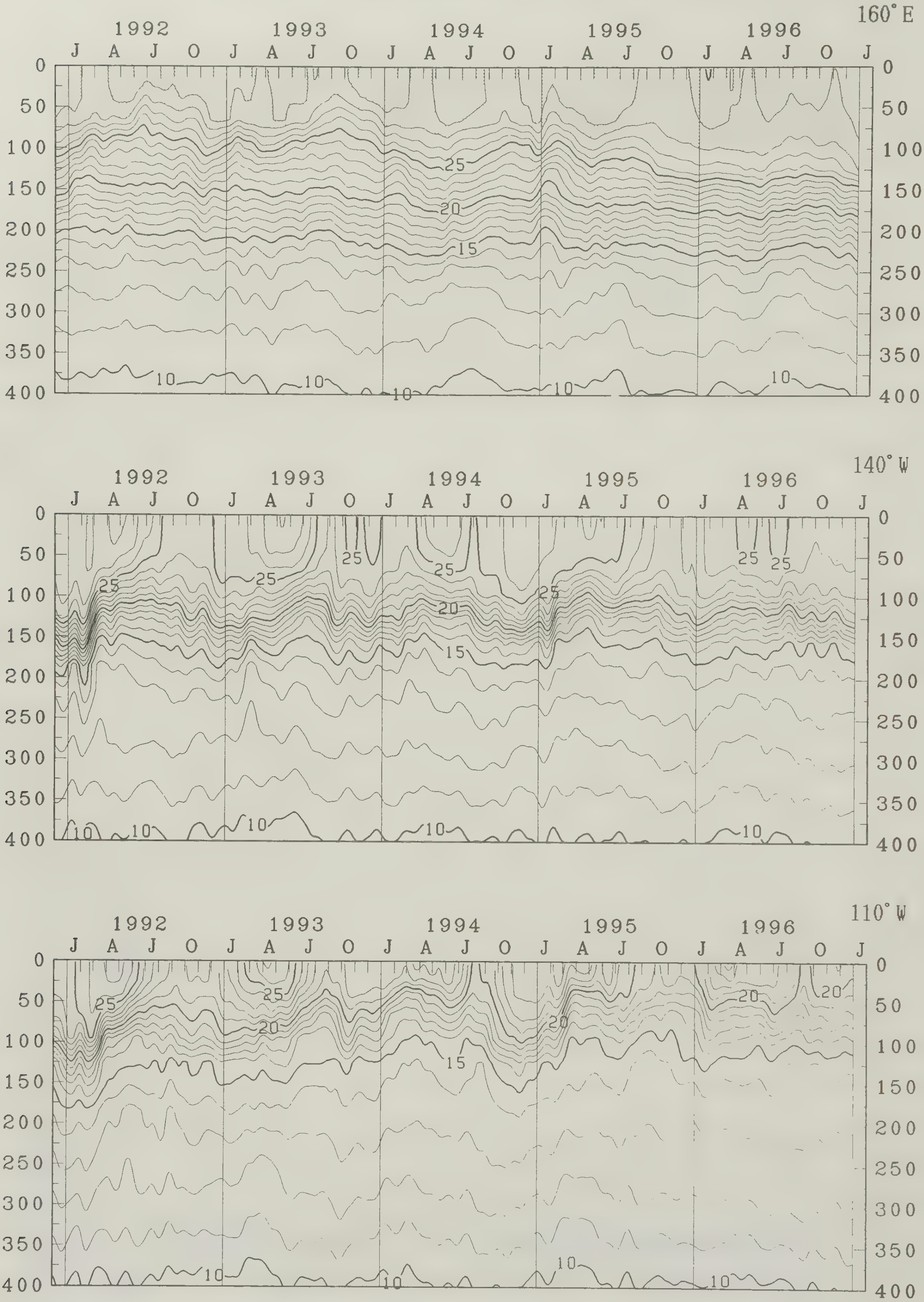
第13図　赤道に沿う海面水温の時間－経度断面図

Fig.13 Time-longitude section of SSTs along the equator (2°N-2°S) in the global ocean.　Contour interval is 1°C, with thick contour lines at 25 and 30°C.
SST values greater than 28°C are spotted and values less than 23°C are shaded.



第14図　赤道に沿う海面水温偏差の時間－経度断面図

Fig.14 Time-longitude section of SST anomalies along the equator (2°N-2°S) computed from the JMA climatology (1961-1990). Contour interval is 1°C, with thick contour lines at +1°C and -1°C. Negative anomalies are spotted.

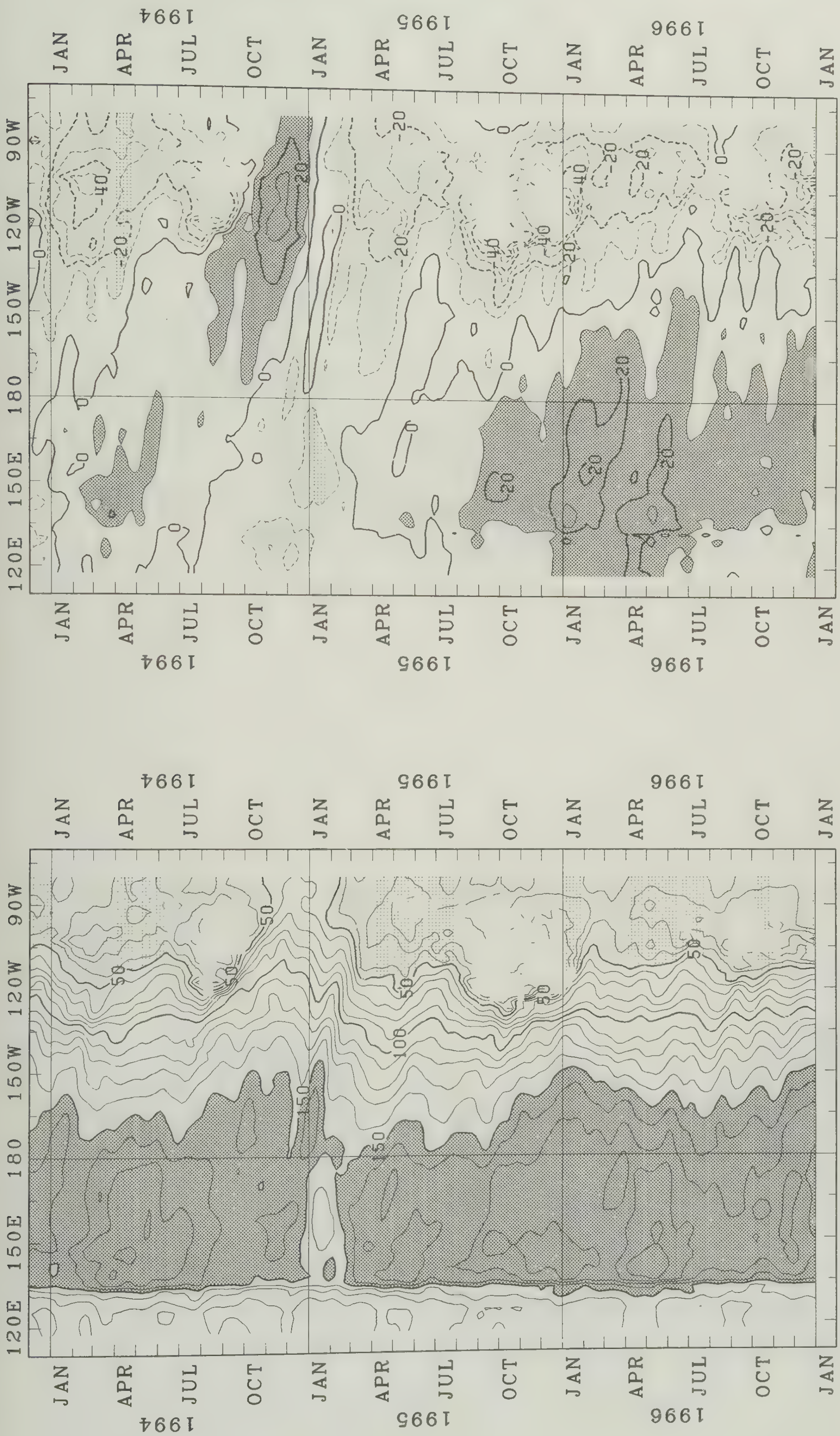


第15図　太平洋赤道域の表層水温の時間－深度断面図

（上：西部、中：中部、下：東部）

Fig.15 Time-depth sections of equatorial subsurface temperature for the western Pacific (top, 160°E), the central Pacific (middle, 140°W) and the eastern Pacific (bottom, 110°W). Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C. Values greater than 28°C are shaded.

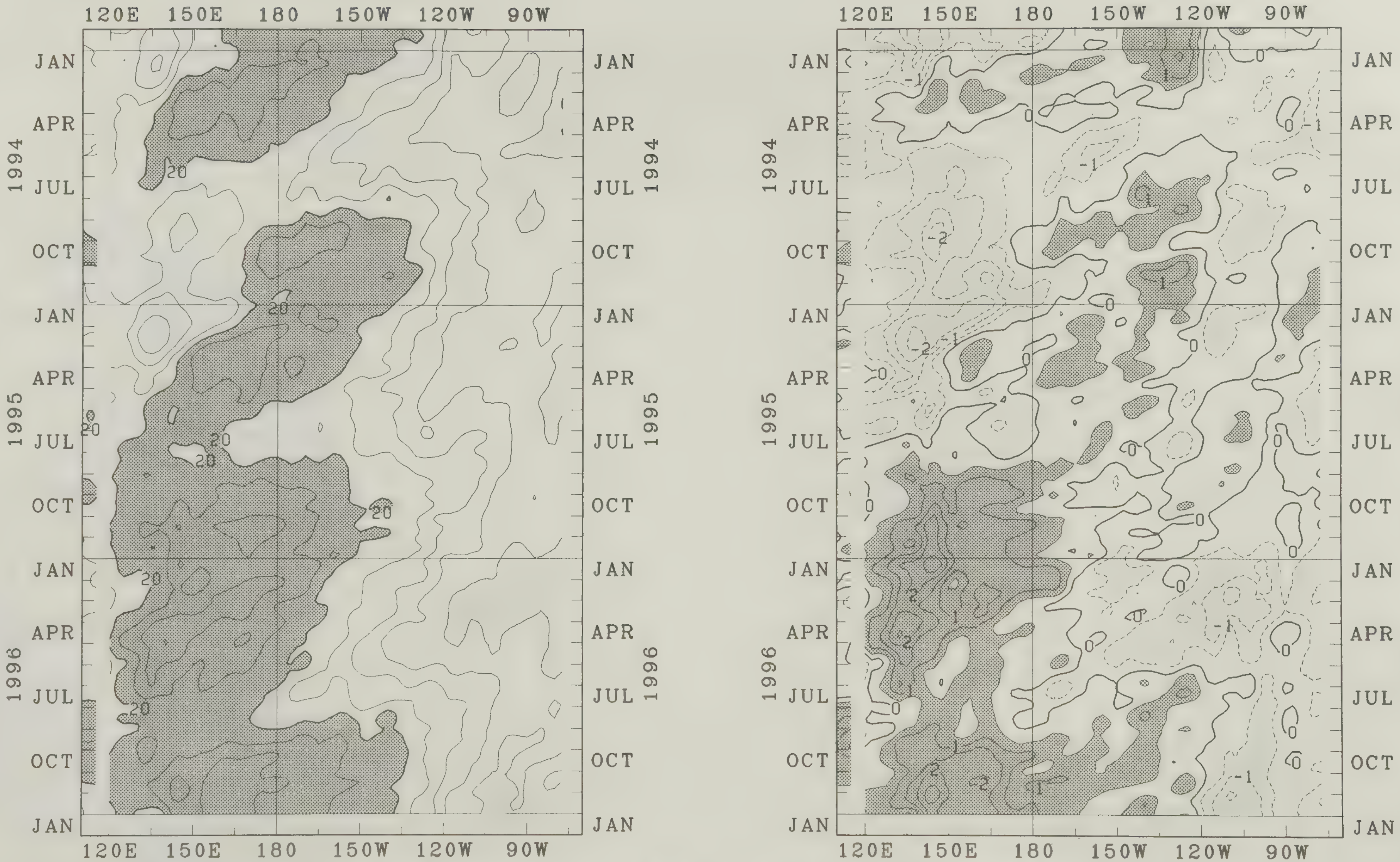
Time-Longitude Section of Depth of 20C & Anomalies (Eq.)



第16図　太平洋の赤道に沿う20℃深度（左）及び偏差（右）の時間－経度断面図

Fig.16 Time-longitude sections of depth of the 20°C isotherm along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 10m. Values in left panel greater than 150m are shaded and values less than 50m are spotted. Dashed contours in right panel indicate negative anomalies. Anomalies are computed from 1987-1995 base period means.

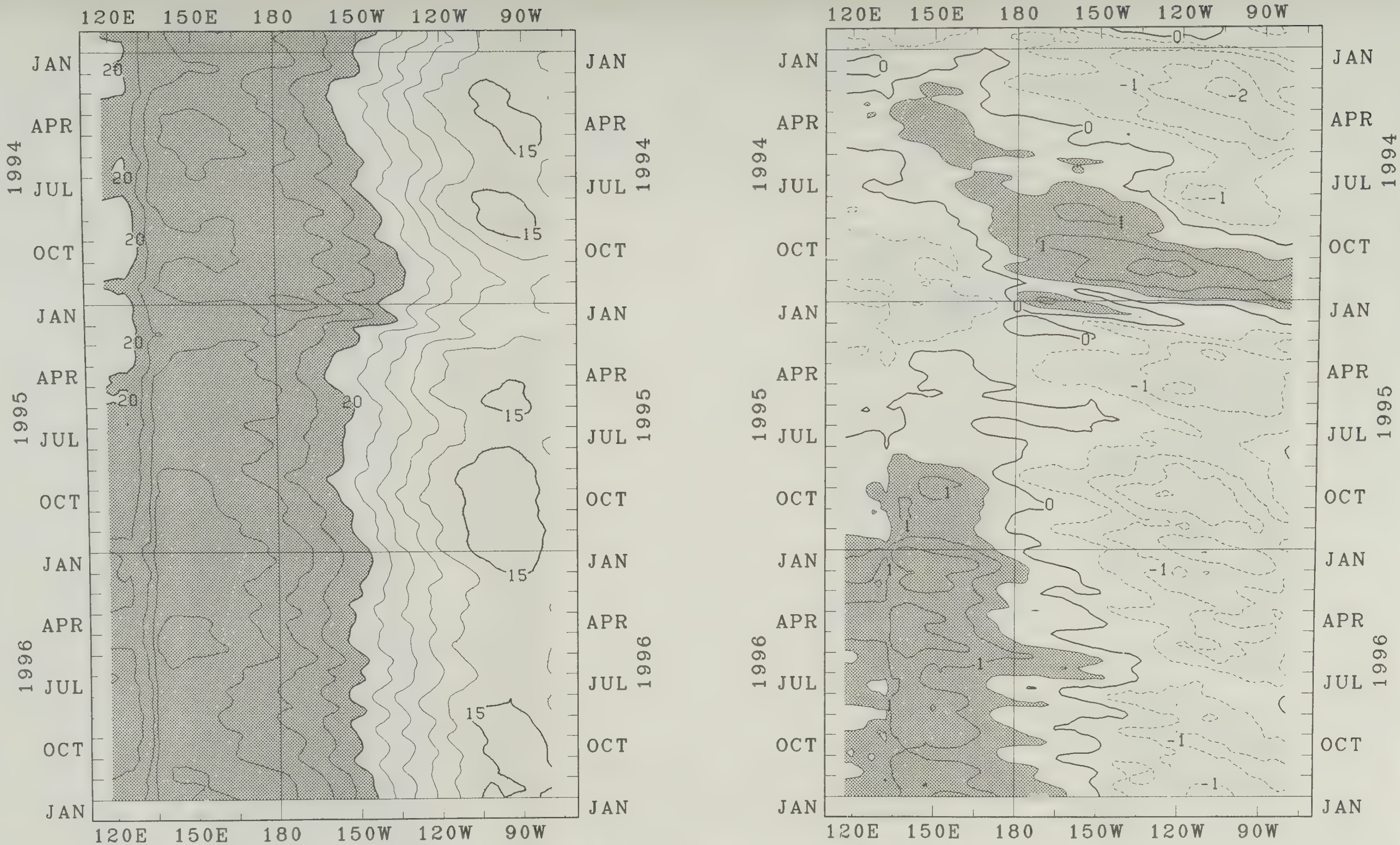
Time-Longitude Section of Ocean Heat Content & Anomalies (6N)



第17図　太平洋の北緯6度線に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

Fig.17 Time-longitude sections of ocean heat content in the upper 260m along 6°N (left) and anomalies (right) in the Pacific Ocean. Data are derived from an Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right). Values in the left panel greater than 20°C are shaded and values less than 16°C are spotted. Dashed contours in right panel indicate negative anomalies. Anomalies are computed from 1987-1995 base period means.

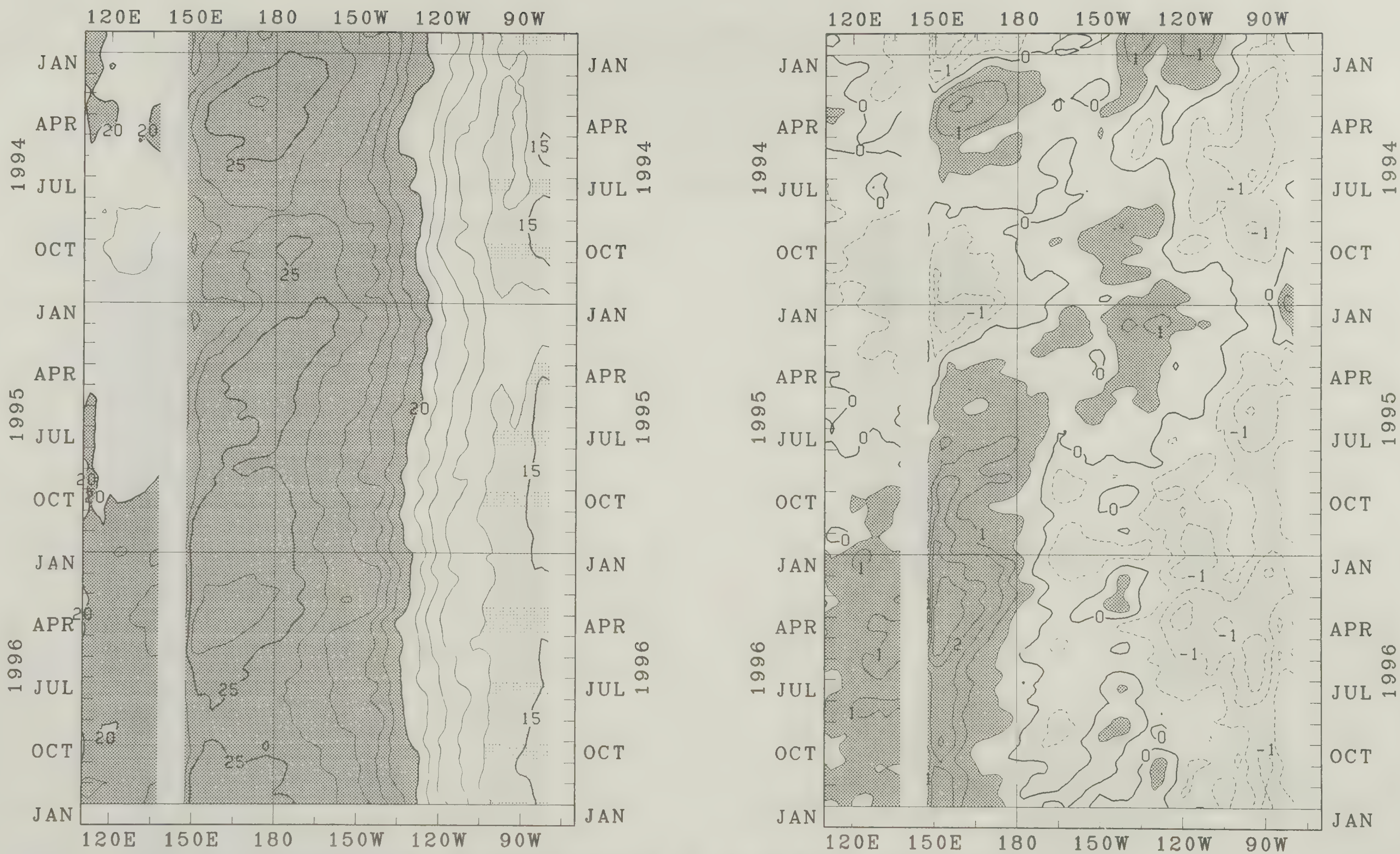
Time–Longitude Section of Ocean Heat Content & Anomalies (Eq.)



第18図　太平洋の赤道に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

Fig.18 Time-longitude sections of ocean heat content in the upper 260m along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right). Values in the left panel greater than 20°C are shaded and values less than 16°C are spotted. Dashed contours in right panel indicate negative anomalies. Anomalies are computed from 1987-1995 base period means.

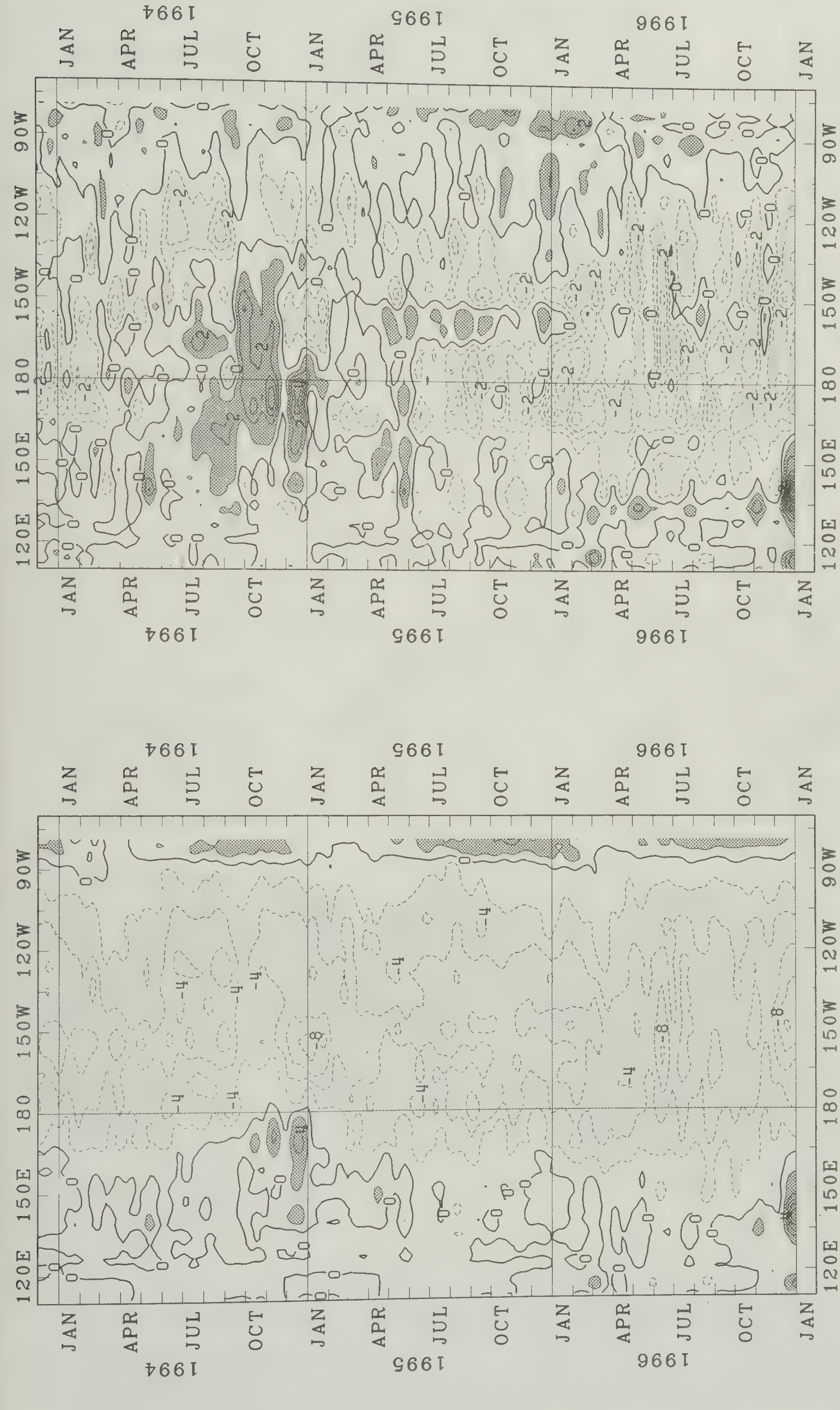
Time-Longitude Section of Ocean Heat Content & Anomalies (6S)



第19図　太平洋の南緯6度線に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

Fig.19 Time-longitude sections of ocean heat content in the upper 260m along 6°S (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right) Values in the left panel greater than 20°C are shaded and values less than 16°C are spotted. Dashed contours in right panel indicate negative anomalies. Anomalies are computed from 1987-1995 base period means.

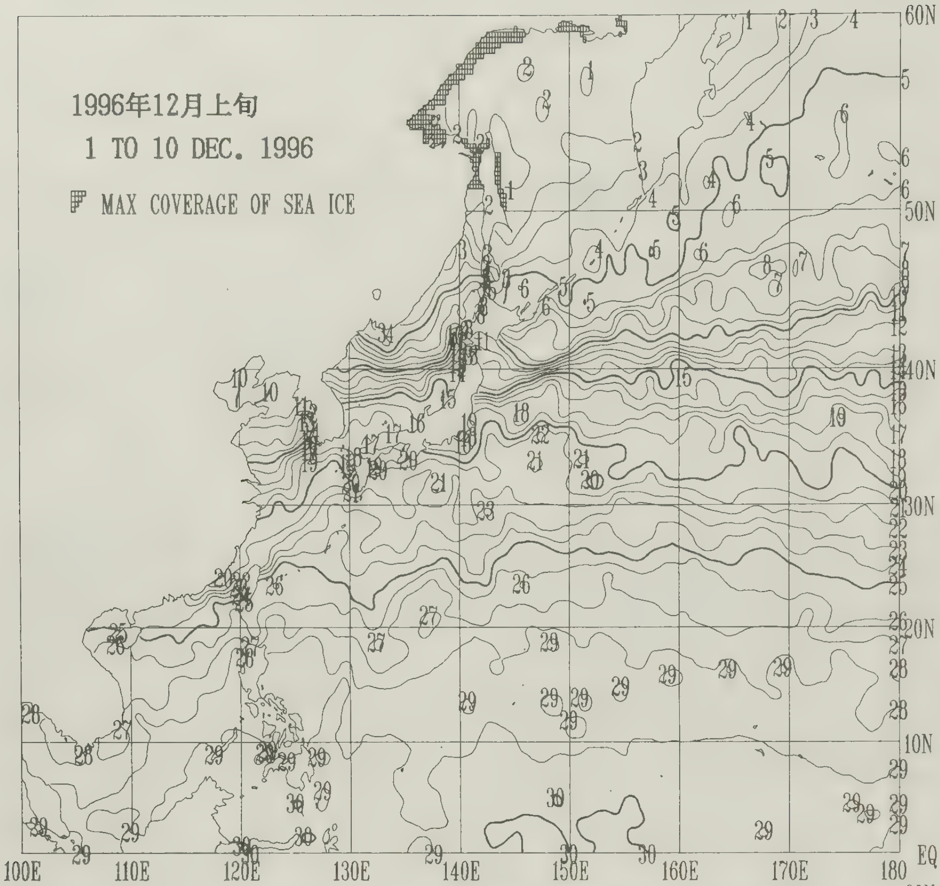
Time-Longitude Section of Surface Zonal Wind Stress & Anomalies (Eq.)



第20図 太平洋の赤道に沿う海面の風応力の東西成分（左）及び偏差（右）の時間－経度断面図

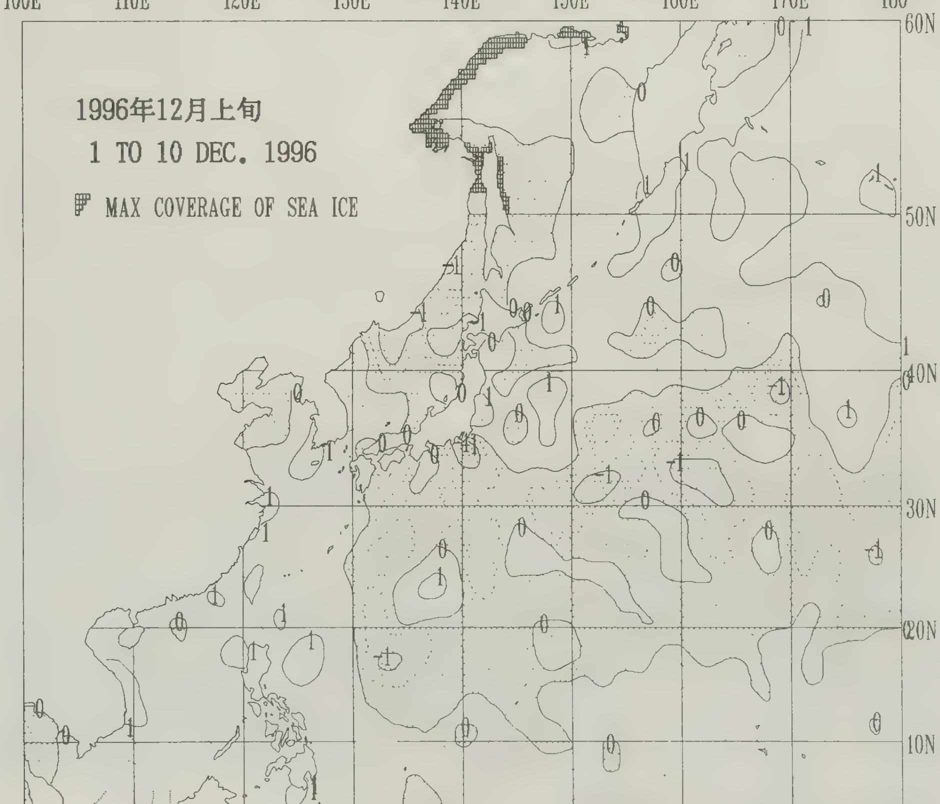
Fig.20 Time-longitude sections of surface zonal wind stress along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Atmospheric Global Data Assimilation System of JMA. Contour interval is 0.02N/m2 (left) and 0.01N/m2 (right). Dashed contours indicate easterlies (left) and easterly anomalies (right). Anomalies are computed from 1987-1995 base period means.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石 垣(47918)	23.1	0.7
御前崎(47655)	13.7	-0.6
八丈島(47678)	19.1	-0.9
小名浜(47598)	15.3	1.5
宮 古(47585)	12.4	-0.4
江 差(47428)	9.8	-
浜 田(47755)	15.6	-



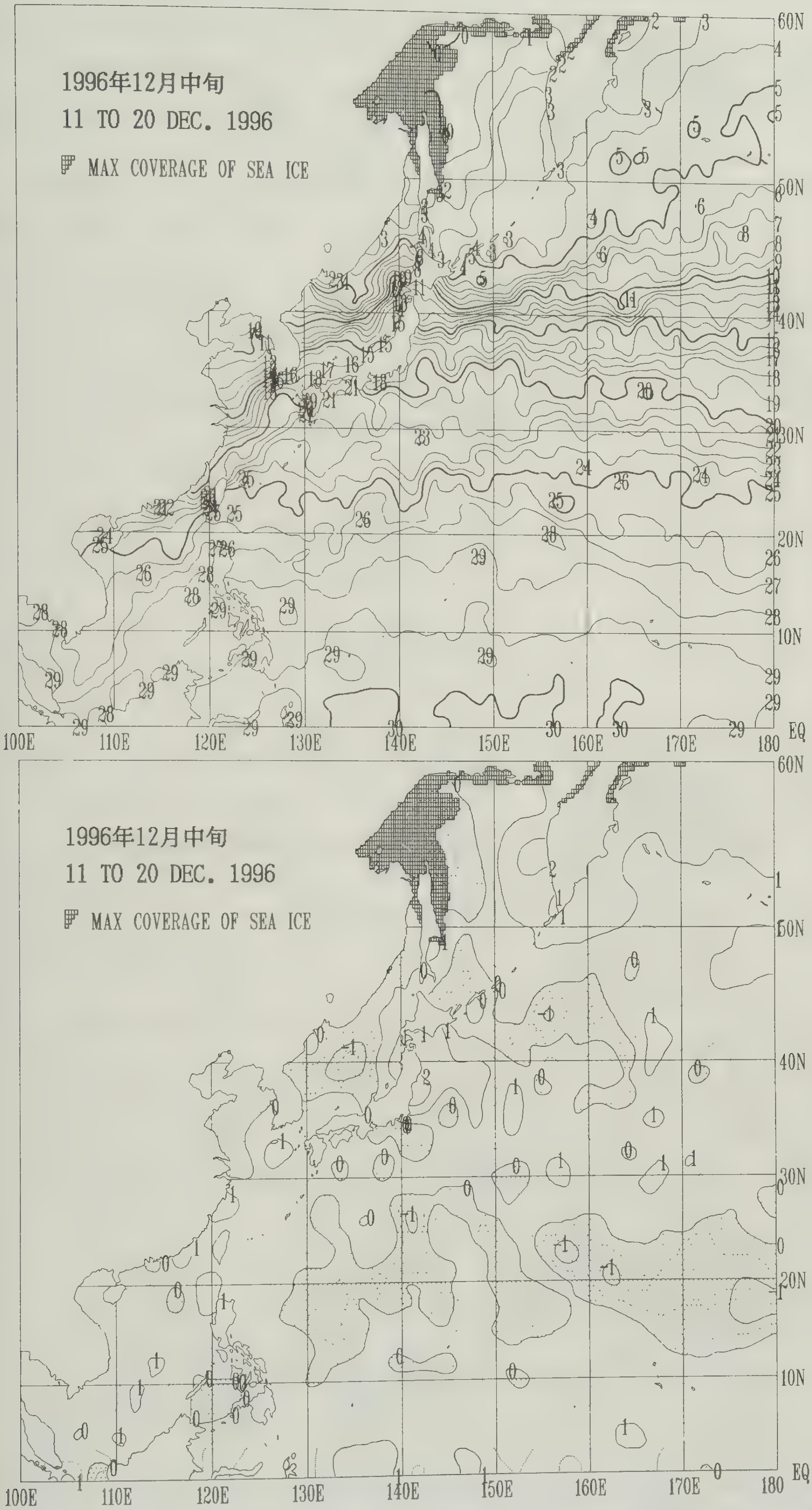
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	15.8
四国沖	29.0N,135.0E	23.0
東シナ海	28.2N,126.3E	22.6

第21図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1996年12月上旬)

Fig.21 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in DEC 1996. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

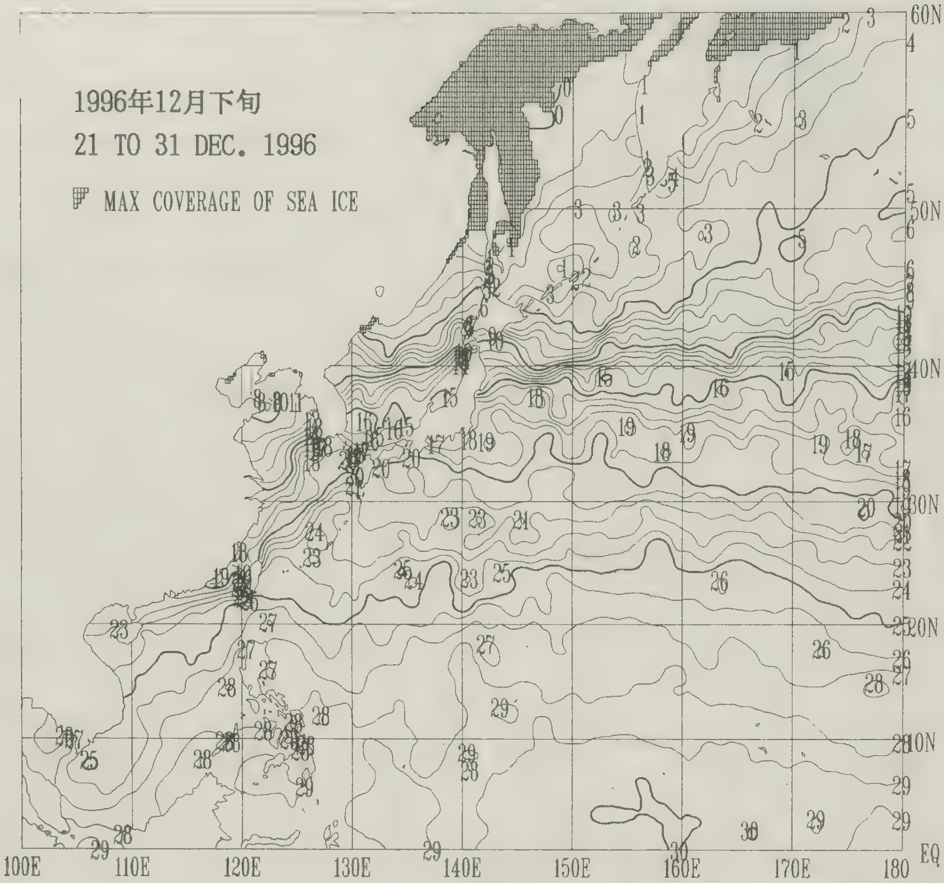
地点名 (Index Number)	水温 Temp.	偏差 Anom.
石 垣(47918)	23.4	1.6
御前崎(47655)	14.7	1.2
八丈島(47678)	19.9	0.5
小名浜(47598)	15.5	2.4
宮 古(47585)	11.9	0.2
江 差(47428)	9.5	-
浜 田(47755)	15.1	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	15.4
四国沖	29.0N,135.0E	22.7
東シナ海	28.2N,126.3E	23.3

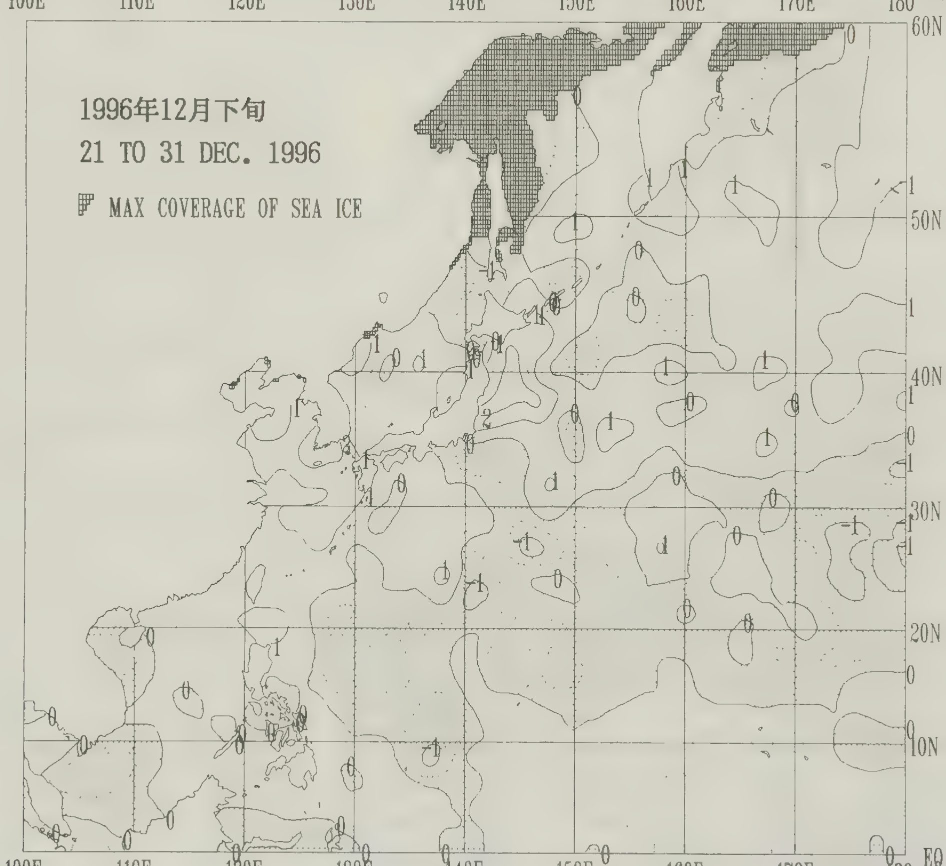
第22図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1996年12月中旬)

Fig.22 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in DEC 1996. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.



旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	22.8	1.3
御前崎(47655)	12.9	0.5
八丈島(47678)	18.9	0.3
小名浜(47598)	14.6	2.5
宮　古(47585)	11.2	0.5
江　差(47428)	7.6	-
浜　田(47755)	14.2	-



海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海 37.9N,134.5E
14.9

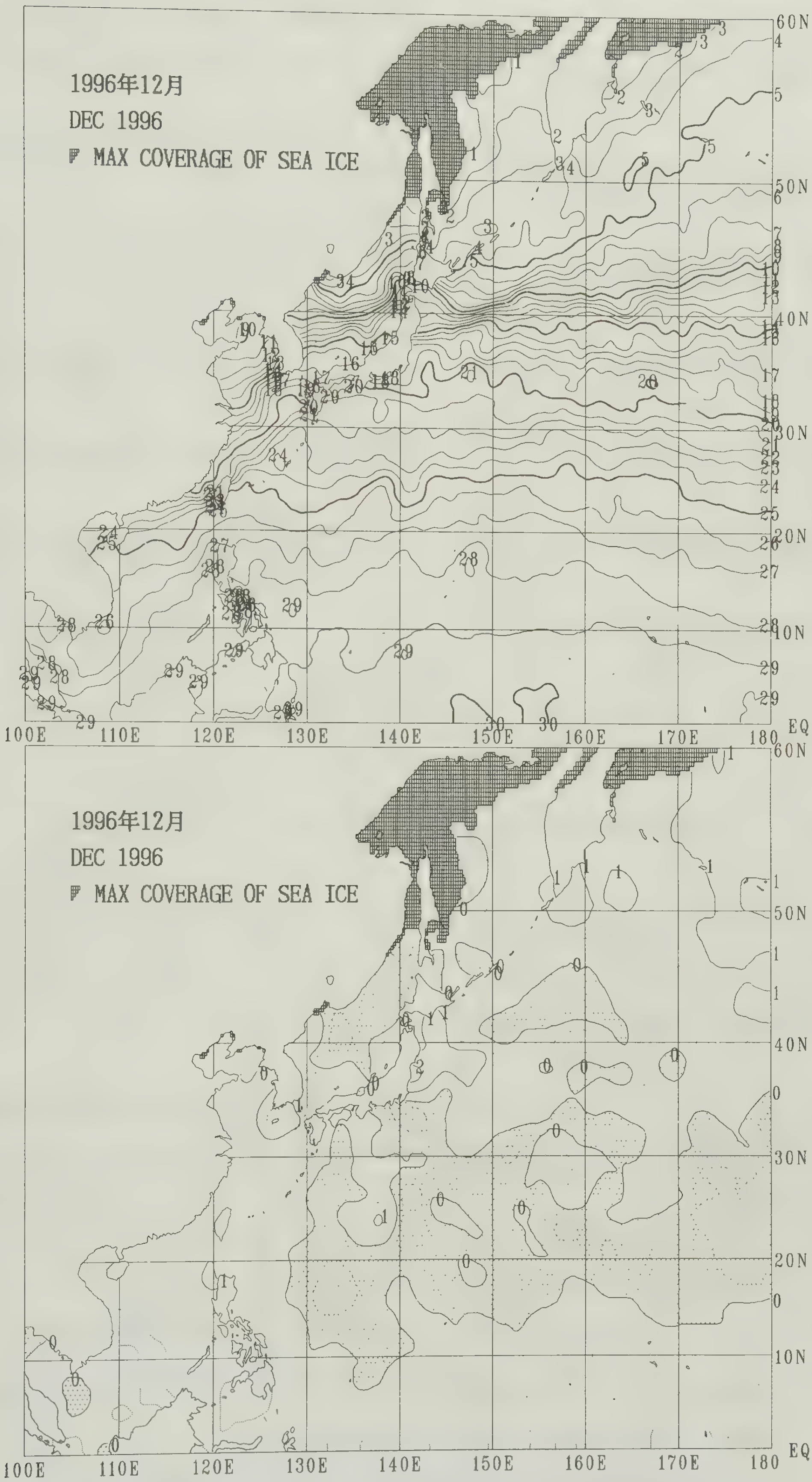
四国沖 29.0N,135.0E
21.5

東シナ海 28.2N,126.3E
22.5

第23図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1996年12月下旬)

Fig.23 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in DEC 1996. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.

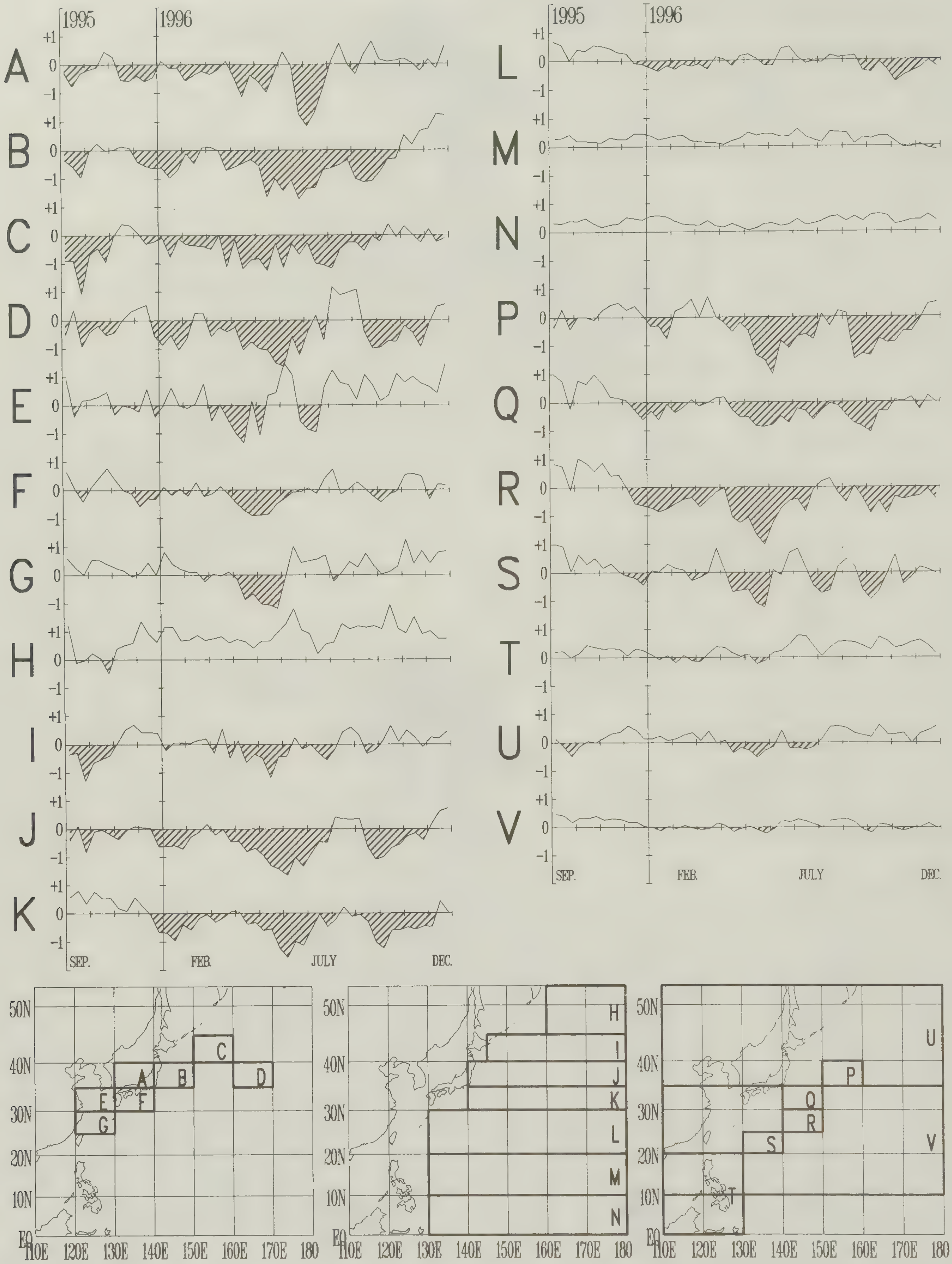
Monthly Mean SST & Anomalies



第24図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1996年12月)

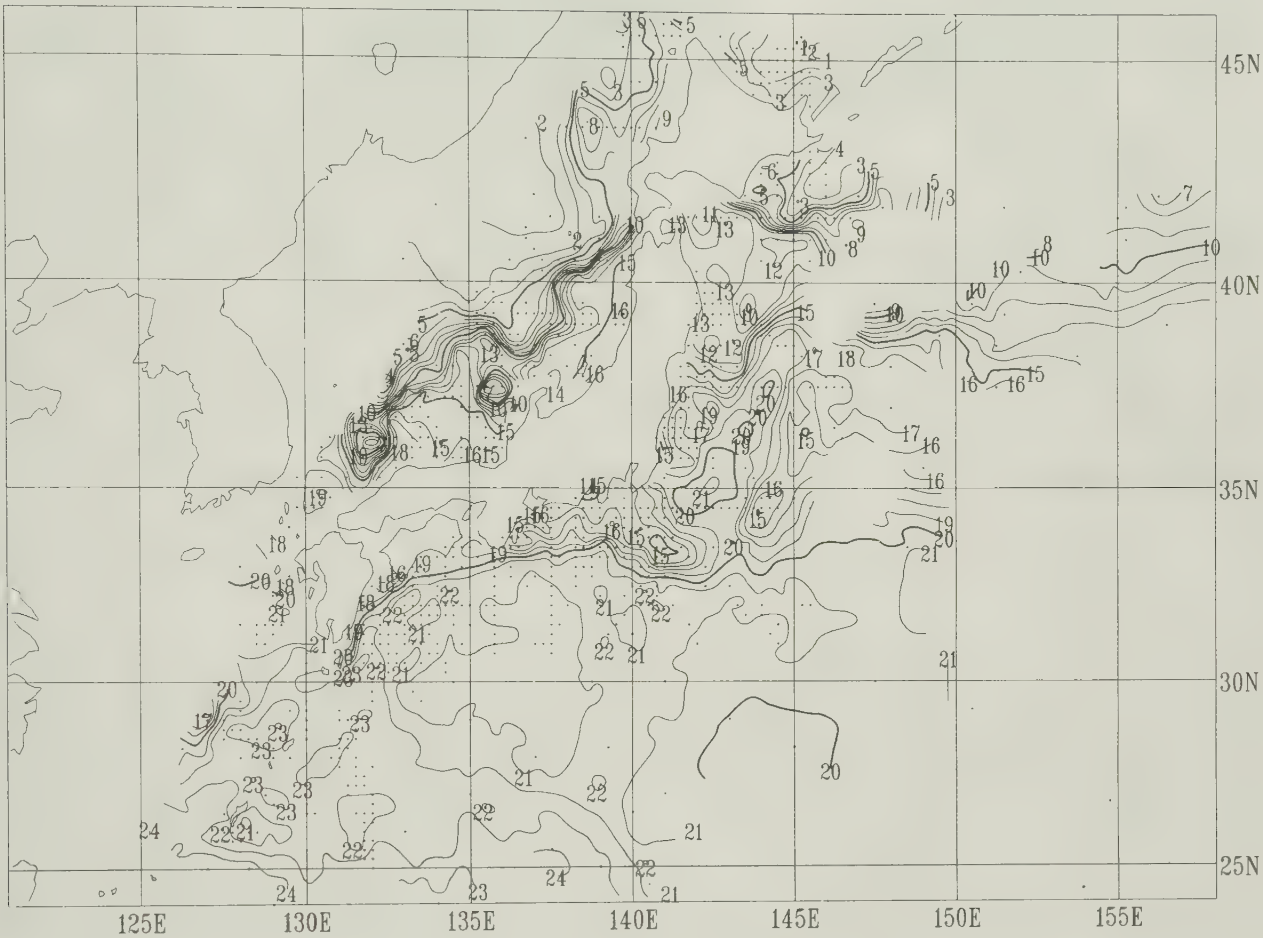
Fig.24 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for DEC 1996. Anomalies are computed from the JMA climatology (1961-1990). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.

Time Series of Area Mean SST in the Western North Pacific



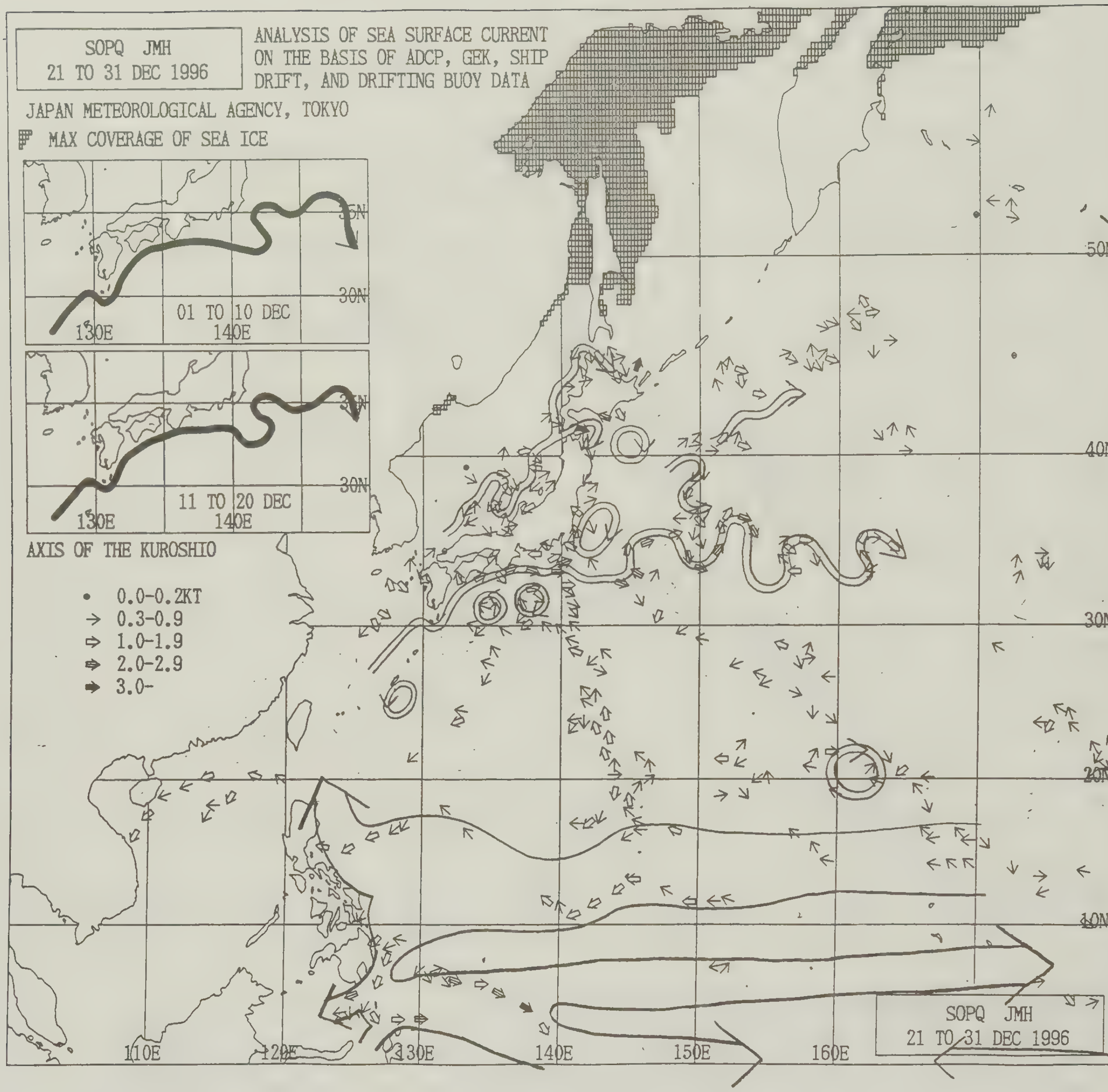
第25図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.25 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1961-90).



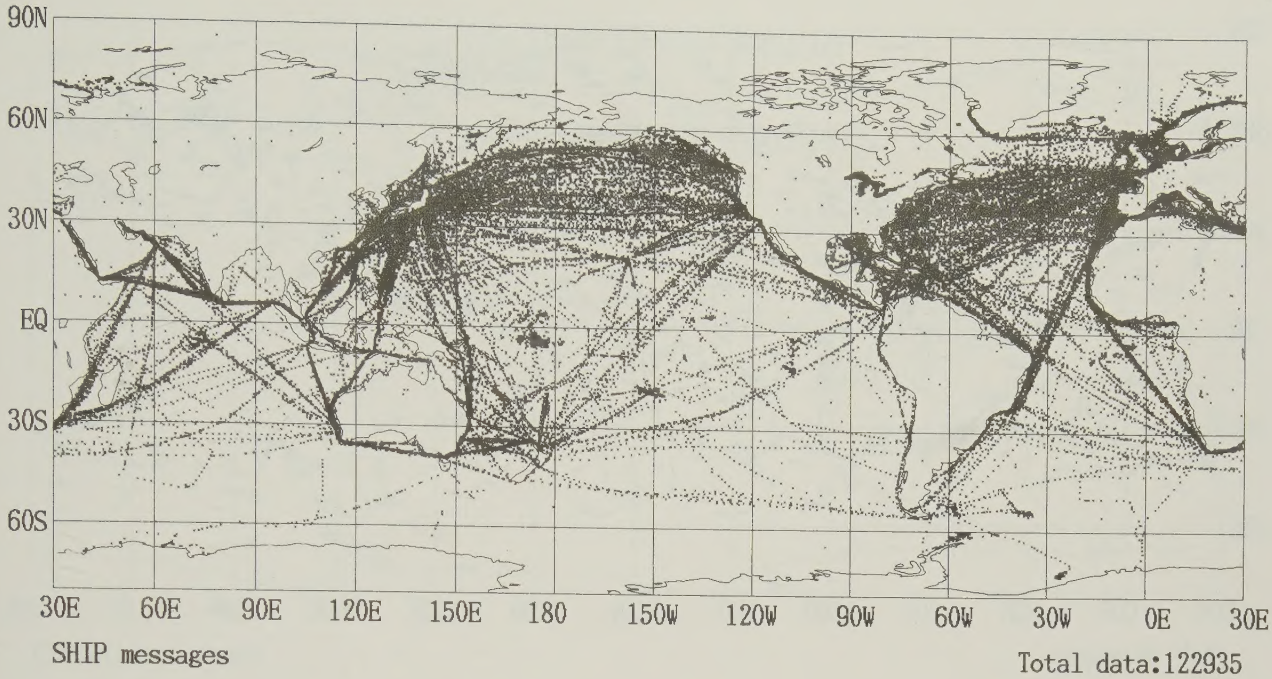
第26図　日本近海表層水温(深さ100m)図 (1996年12月)

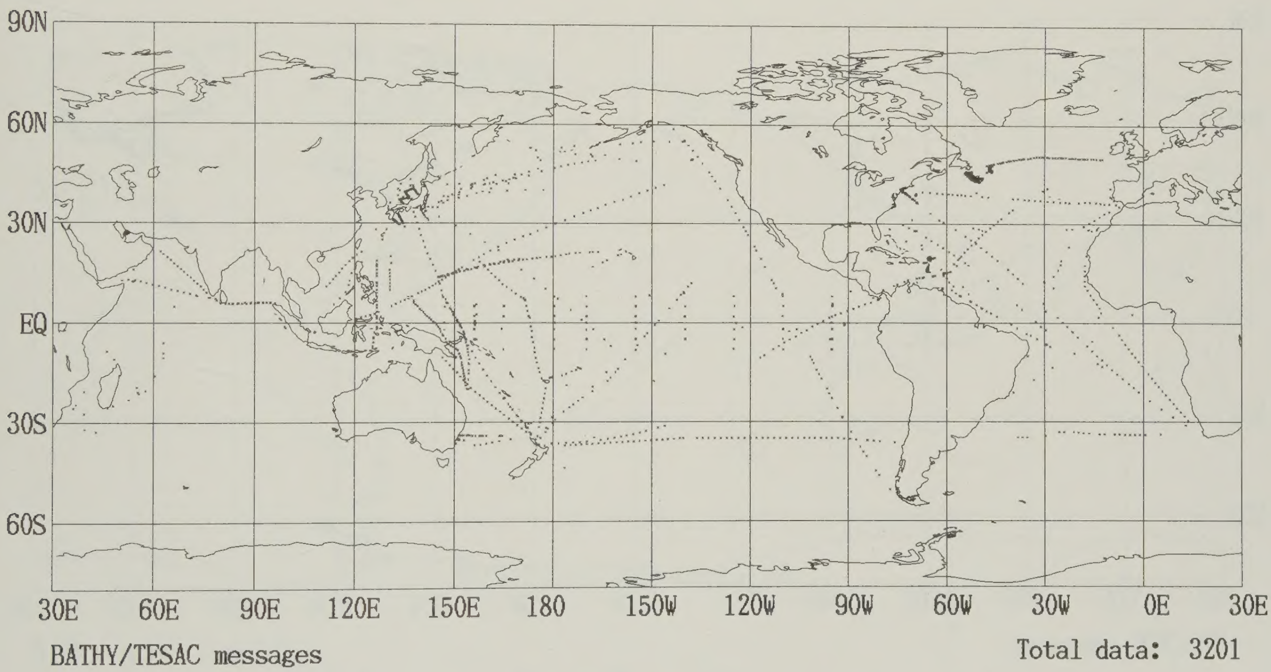
Fig.26 Subsurface (100m) temperatures in seas adjacent to Japan for DEC 1996. Contour interval is 1°C. Observation points are denoted by dots.



第27図　北西太平洋海流図（1996年12月下旬）

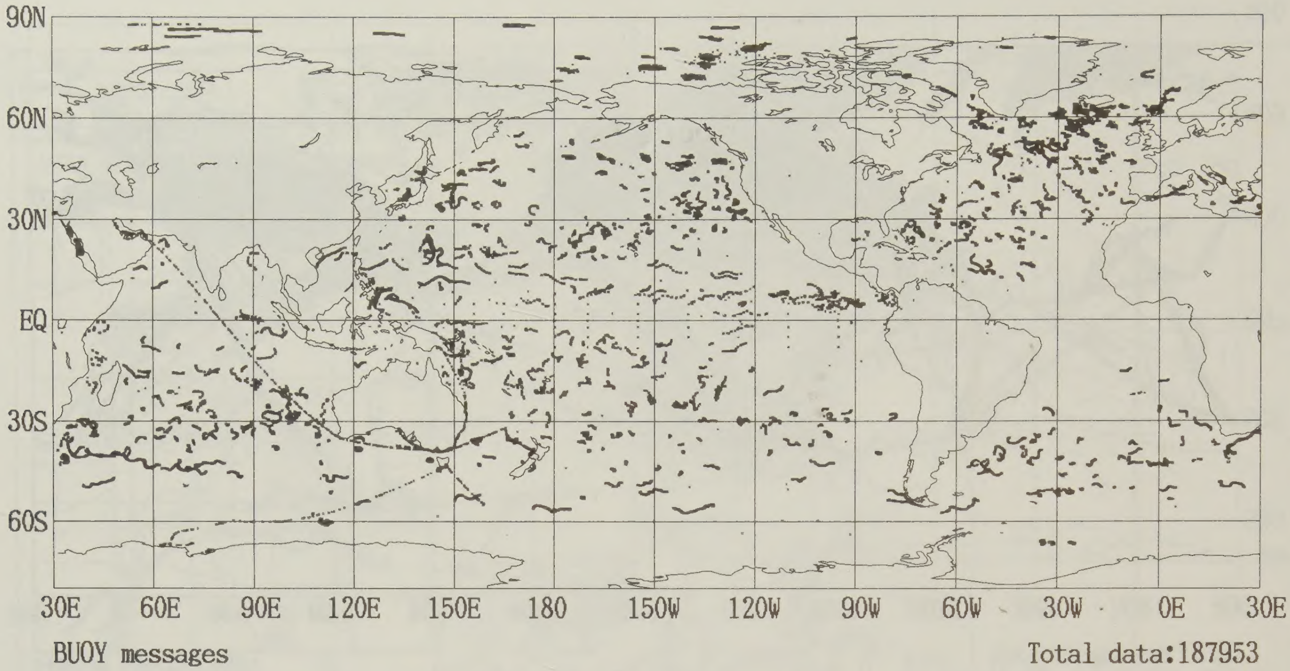
Fig.27 Analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in DEC 1996. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

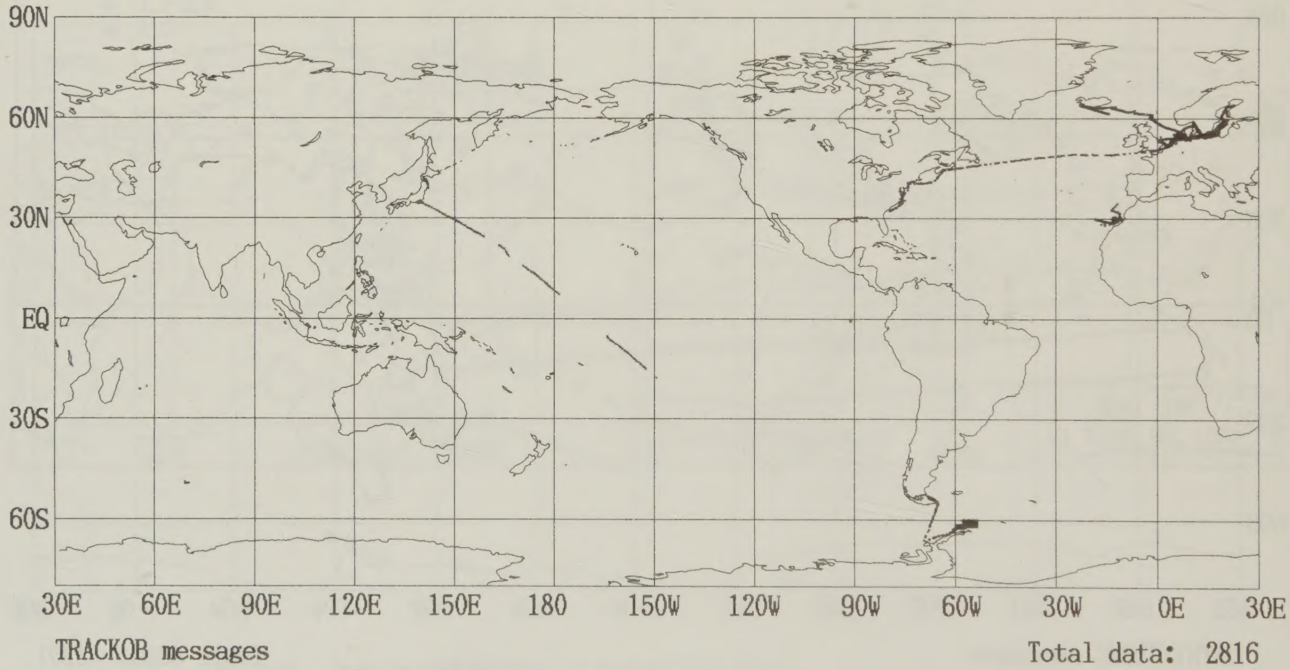




第28-1図　測点分布図(1996年12月)

Fig.28-1　Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for DEC 1996.





第28-2図　測点分布図(1996年12月)

Fig.28-2 Geographical distribution of BUOY messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for DEC 1996.

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